

INSTRUCTION MANUAL

CEL MS830, 831 & 832

MAURICE MINOR II

DIGITAL VIDEO EFFECTS SYSTEMS



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MS830, 831 & 832 VIDEO EFFECTS SYSTEMS INSTRUCTION MANUAL

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IMPORTANT NOTICE

The Printed Circuit Boards in the P163 and P164 units are sensitive to damage from static. If it is necessary to remove any of the boards, earthed anti-static mats should be used and personnel must ensure that they are electrically connected to ground.

If this is not done, serious damage may be caused to the unit. Users who do not have these facilities should not open the P163 or P164 units or remove the printed circuit boards from it.

N.B. Before you feel any static discharge, the devices could be destroyed.

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1.0 INTRODUCTION

The CEL Systems covered by this Instruction Manual are:

MS830 (Single channel without mixer)

MS831 (Single channel with mixer)

MS832 (Dual channel with mixer)

Each of these includes the P163 as the effects controller for the system, which is used for all of the operational functions.

The P163 is a Video Effects Controller which is designed to operate one or two P164-38 units. This provides single or dual channel digital effects. In addition, the effects channel(s) may be combined with a third video channel and its associated key signal (such as a caption generator) and a background video source, if one P164 is fitted with a Built-In Mixer.

The P163 enables control of all the functions that are incorporated in the P164-38 Digital Effects unit. It is self-contained, and communicates with the/each P164 via a serial link. The P163 also enables direct running of pre-set Moves and Sequences, as well as programming and running of user-defined sequences. These sequences are stored in the unit, and may be used on subsequent occasions, even if the power has been turned off.

Operation of each of the various functions and effects capabilities of the P163 Controller can be carried out with a few simple button selections. Many of them use the LCD Display to indicate the route to the function or to enable further options. Some features can be controlled in different ways (such as picture position), to enable coarse or fine adjustment.

HOW TO USE THIS MANUAL

Use this manual in conjunction with the P164 Instruction Manual, which describes the connection and setting-up of the P164-38 unit.

To commence operating the unit, follow the 'Getting Started' instructions (Section 2). Additional connection details can be found in Section 5 (Connections & Installation).

The next section of the manual gives a brief explanation of the control panel layout, explaining the function of each group of buttons and controls.

To find out HOW to operate a particular function, look at Section 4, which explains the operation of the various facilities of the unit.

2.0 GETTING STARTED

First, connect the power lead and video cables of the/both P164-38XP(s), and switch on. Follow the 'Getting Started' instructions in the P164 Instruction Manual (Section 2). Check that the/each P164 is working.

Remove the P163 Controller from its box and packing.

CONNECTION

With the P163 is a 'Y' cable which connects the unit to one or two P164s. The 7-pin round connector plugs into the short lead at the back of the P163.

The two yellow 9-way 'D'-Type connectors plug into the 'Controller' socket on the rear panel of the P164s. For a single-channel system, only use the thick lead. For a dual-channel system, the thick lead is plugged into channel 1 and the thin lead is for channel 2. Channel 1 is the unit which includes the Built-In Mixer (P164-38XPB)

If the unit is connected to an editing system (such as the CEL 'ERIC' edit controller), the General Purpose Interface (G.P.I.) is used to trigger moves and effects. It is connected via the Red connector of the second 'Y' lead (DIN plug to two BNC connectors) to the other short flying lead (with five-pin connector) on the rear of the P163 with a standard BNC connector. For an ERIC system, this lead goes to the VTR B interface card on the rear of the P158. The 'Move to Start' (Black BNC) connector can also be used in conjunction with a suitable edit controller to reset Moves and Effects to their start point; for the CEL P159 Editor, connect this lead to Port 4.

When first connected to the P164, all of the LEDs on the P163 will light.

Additional details of connecting the system are given in Section 5, Connections and Installation.

EFFECTS

When first turned on, the unit is ready to control digital video effects straight away.

Simply press any of the buttons 1 - 9 of the Number Pad (right-hand section of the panel) to make the P164 perform Zooms, in the direction of the small arrows marked on the buttons. Pressing the 'GO' button (bottom left) causes each move to repeat, swapping direction each time. For two-channel systems, these moves will be on Channel 1.

To carry out other pre-programmed Moves, press 'MOVE' (below the Number Pad). The LCD display (top left) will now show: FOLD SLIDE ZOOM. Press one of the function buttons F1 or F2 to select one of the other modes and then use the Number Pad buttons again to carry out the effects.

Press the 'FUNCTION' button beside the Spinwheel (bottom right), this lights the 'SEQ SPEED' LED beside it and makes the Spinwheel control the speed of the moves. The time of a move (in frames) is shown in the LCD display.

To operate some of the pre-programmed Sequences (of moves and effects), press: SEQ 2 0 ENTER then: 1 3 ENTER then: 1 2 ENTER

PICTURE CONTROL

Press the 'FUNCTION' button beside the Joystick (top right), this lights the SIZE/POSITION LED beside it and makes the Three-Axis Joystick control the size of the picture (by twisting it) and the position (by moving it around). The 'Small Size' and 'Off Screen' indicators (to the right of the T-Bars) give a warning of what has happened to the picture if you make it disappear from the screen. 'NORM SIZE' resets the picture to full size.

With the picture slightly smaller than full size, it is easier to see some of the other effects. Press the 'BEND' button (to the right of the T-Bars); the LCD display will show: 'PERSP CIRCLE'. Now operate the T-Bars T1 and T2 to change the perspective and horizontal circle function of the picture. Press it again, so the display shows: 'SKEW CREASE', which enables further picture manipulation.

The two borders are set by pressing the 'BORD' button (bottom right). The sizes are set with the T-Bars, and the colour of each one with the Joystick.

Further explanation of the unit's operation is given in Section 4, which explains how to operate the various facilities. Section 3 is a description of the panel layout and the functions of the groups of buttons and controls.

3.0 CONTROL PANEL DESCRIPTION

The P163 Controller has a Liquid Crystal Display (LCD), which shows a series of messages and different 'menus'. From some of these menus there is access to 'sub-menus' with the four function buttons below the display, which are also used to select or switch on various effects and features.

The buttons and controls on the panel are arranged in groups, according to their function. The following descriptions explain the actions of each of the groups. They are given in order starting from the left-hand side of the panel. Full details of HOW to operate the different facilities of the system are provided in Section 4 (Operation).

3.1 MENU FUNCTION AND MOVEMENT CONTROL BUTTONS

Below the LCD display are four 'soft' function buttons: F1 F2 F3 & F4. These have different uses, as indicated by the 'menu' shown on the display. Apart from specific operational use, they are used for selecting 'sub-menus' which give access to further settings and facilities.

The main (or 'top') menu is displayed by pressing the solid up arrow button to the right of the display. The left and right arrow buttons give access to adjacent menus. Once 'sub-menus' have been selected, the outline up arrow button steps back up one menu level.

CLEAR This resets the picture to normal size and turns off any
NORM Borders or other effects that had been set.

GO STOP 'GO' starts the last Move or Sequence in the direction shown
IN/OUT by the LEDs in the 'IN/OUT' button (which is used to change the direction). It toggles (or swaps) the pre-set move direction, but runs programmed sequences in the same direction. The STOP button will pause a move or sequence while running, it can be re-started with 'GO'. When running pre-set moves, 'STOP' gives a 'Move To Start' for the direction indicated by 'IN/OUT'; with user-defined sequences, press 'STOP' twice for a Move To Start.

G.P.I. ON/OFF Enables a remote piece of equipment to trigger a Move or Sequence, exactly like the 'GO' button. This could be an edit controller, connected to the Red BNC connector of the GPI lead.

3.2 T - BARS AND CONTROL BUTTONS

The two T-Bars (or 'Wipe Arms') T1 and T2 can be assigned to various functions. They are turned on by the buttons to their right.

MIX Only used for systems which include a Built-In Mixer. It cycles through three states, as shown on the display. For T1 : Layer 1 mix to Layer 2, Mix off Layer 2 and Mix off Layer 3, plus other options. Fade to Black is on T-Bar T2.

MAN SEQ Makes T1 manually control the movement of the last move or sequence that was run. This is useful for stepping through sequences that have just been created.

BEND Sets the two T-Bars to three different pairs of picture manipulation functions (as shown on the display). They are:
PERSPECTIVE and HORIZ, CIRCLE
HORIZ, SKEW and HORIZ, CREASE
HORIZONTAL SIZE and VERTICAL SIZE
A fourth press of 'BEND' turns off the T-Bar functions.

3.3 CHANNEL SELECT AND SEQUENCE CONTROL BUTTONS

In a two-channel system, which one of the P164s being controlled is set by the 'CH, 1/2' button. When manipulating the picture, or programming individual shots of a sequence, each channel is controlled individually. For a single-channel system, use Channel 1.

The 'BOTH' button selects whether one or both channels are used when running a move or sequence. If its LED is not on, only the channel selected with the 'CH, 1/2' button will run.

LEARN Sets the unit into Program (or Edit) Sequence mode. The Number Pad LEDs will flash, until one of them is pressed to select a particular sequence number. Then the other Sequence Control Button LEDs will flash, indicating that they can now be used. Also, the display will show the Current Shot and total length of the sequence.

NEXT
PREV

For stepping forwards and backwards through a sequence that is being programmed or edited, to the Next or Previous shot.

INSERT
REPLACE
DELETE

Once the picture has been put to the desired size, position and shape, plus the speed of movement and any borders and other effects, for the next shot (or Keyframe), it can be inserted after the Current Shot of the sequence. To change any of the parameters of a shot, REPLACE is used. Removing a shot is done with DELETE.

3.4 NUMBER PAD AND MOVE SELECTION BUTTONS

The Number Pad provides the facility to make a specific numerical entry, such as selecting a pre-programmed or user-defined sequence, a particular composite input or one of the four 'User State' set-up stores of the P164. These changes of function of the Number Pad are set with the Mode Selection buttons below it (see Section 3.5).

They are also used for selecting and running the pre-set moves that are provided (SLIDE, FOLD & ZOOM). The directions of these moves are as shown by the small arrows marked on the buttons. For example, with ZOOM selected, pressing Button 8 (Top Middle) causes a Zoom between the centre point of the top edge of the picture and Full Size (or previous size and shape). SLIDE will operate in the eight directions around the keypad. FOLD performs an effect similar to a fold from each of the four edges; as a corner fold is not possible, there is an effect provided to put an Inset compressed picture into each of the four corners of the screen with these buttons. Pressing the 'GO' button repeats each move, swapping the direction each time.

When running Moves A 'Move To Normal' function is obtained by pressing '0' (zero), to move the picture from its current size, shape and position to full-screen at the set Movetime (as adjusted with the Spinwheel). This direction of the move is with In/Out set to 'In'.

ENTER For running a newly-selected Sequence (either one programmed by the user or a pre-programmed one supplied with the system).

C/CE For temporarily turning off the T-Bars when they are assigned to be controlling any of the functions.

3.5 MODE SELECTION BUTTONS

These buttons select the mode of operation of the P163 and the functions that other buttons (particularly the Number Pad) are used for.

PRE
SET

Enables each of the four 'User State' stores of all the set-up parameters of the P164 to be accessed (for Store and Recall), and recall of the Factory Preset state (Number Pad 0).

SOURCE

Provides direct selection of the four Composite Video Inputs with either the Number Pad or the four Function buttons. The other inputs (Dub, S-VHS Y/C, Digital, etc.) can be selected by pressing the outline up arrow beside the display, which will then show the options available (including Standard Selection).

MOVE

Sets the Number Pad buttons to activate the pre-set moves of SLIDE, FOLD & ZOOM, as indicated on the display and selected with the Function buttons (see Section 3.4, above).

SEQ

Enables direct access to the pre-programmed sequences that are provided and the user-defined sequences that have been programmed into the unit; by pressing the Number Pad buttons, followed by 'Enter'. Pressing the 'GO' button runs the last selected sequence again, always in the same direction.

EFX

Gives access to two EFFECTS menus; each one enables certain functions of the unit, the first press (EFFECTS 1 menu) gives:

INVERT - Horizontal & Vertical Inversion and H & V Mirrors (about a central mirror line), with the four Function buttons.

TUMBLE - Enables Horizontal FLIPS, Vertical TUMBLES and Perspective in the Tumbles when operating the pre-set MOVES.

WOBBLE - The Size of the this function and phase (where it starts) are set with the T-Bars, frequency with the Spinwheel.

BLINDS - The size (Vertical width) of the blinds is set with the Spinwheel; effective when the picture is NOT central.

3.6 FREEZE, JOYSTICK AND SPINWHEEL CONTROL

- FREEZE** FREEZE causes an immediate jitter-free field freeze of the input. It can be selected to be a freeze of the output using the display and Function buttons. It can also be set to be a Frame Freeze, using two fields of input. GRAB updates the frozen image from the current input source.
- GRAB**

The Joystick can be set to control the size and position of the picture. Pressing the 'FNCTN' (Function) button beside it to switches on the Joystick (and turns on the SIZE/POSN indicator). The size is set by twisting it, and the position by moving it around.

The Joystick also controls the colour of Borders and Drop Shadow, when they are selected for adjustment from the appropriate buttons and menus (indicated on the display).

The Spinwheel can be set (with the FNCTN button beside it) to adjust the time taken for a move or sequence, the time in frames is shown on the display.

It can also be used to set various video levels (from the display SETUP menu), denoted by the 'LEVELS' indicator being lit. The level being adjusted can be set back to the normal calibrated setting by pressing the 'CAL' button.

The second press of the EFX button gives EFFECTS 2 display:

- F.C.I.** - The Spinwheel selects the eight sets of False Colour Imaging available.
- QUANT** - The Spinwheel selects the 15 levels of Quantisation, based on the turning off some of the eight bits of information.
- PIX** - Enables Pixelation of the picture into tiles of the same colour, controlled with the Spinwheel.

BORD Enables each of the two borders to be set, the size with the T-Bars and the colour with the Joystick (Up/Down - Luminance, Left/Right - Saturation, Rotate - Hue). Border 1 is outside and Border 2 is inside; which one is being adjusted is indicated on the Display. Other attributes of the Borders and Drop Shadow can be set up from the BORDER menu of the display.

NORM SIZE Sets only the size, shape and position of the picture to be normal (full screen); it does not affect any other set-ups or effects.

Close to the Mode Selection Buttons are the 'Small Size' and 'Off Screen' LED indicators. These show what has happened to the picture if it disappears from the screen.

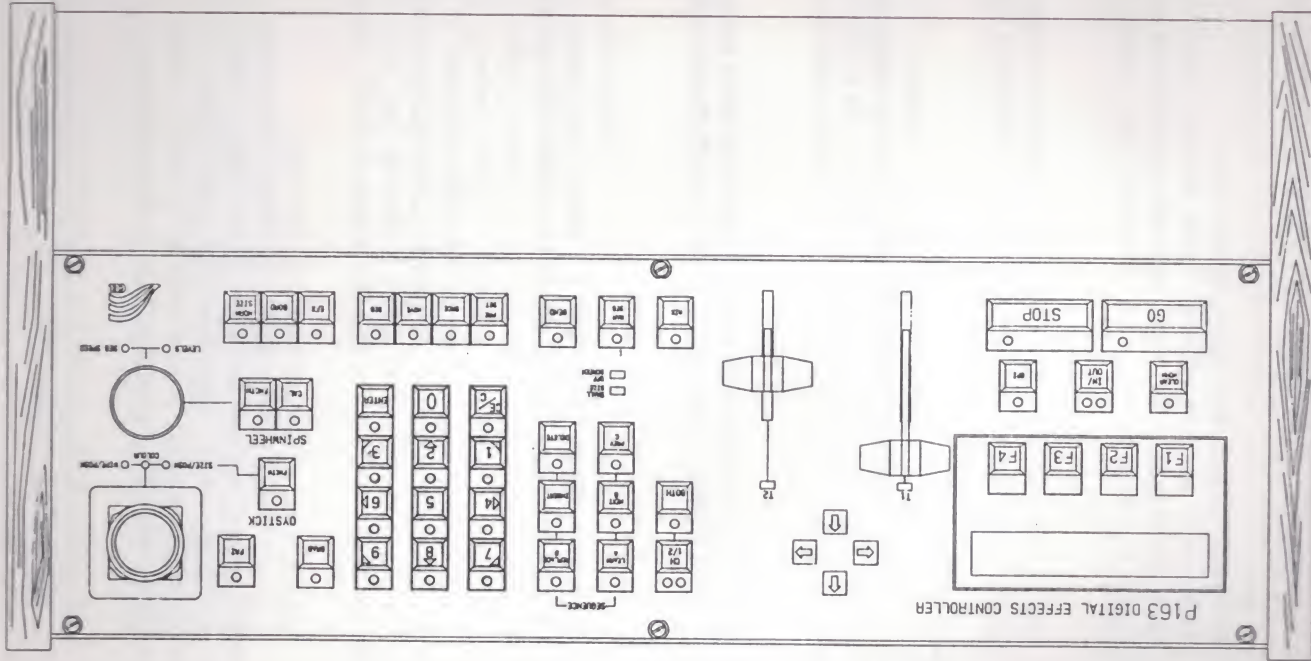
SMALL SIZE Shows when the picture is Zoomed down very small (either with one of the pre-set moves, or manually with the Joystick).

OFF SCREEN Shows when the centre of the picture has been moved outside the active picture area (either with one of the pre-set moves, or manually with the Joystick). Note that some of the picture may still be visible when this indicator is On.

4.0 OPERATION OF MS83X SYSTEMS

The P163 functions are listed alphabetically, the 'route' of which buttons and controls need to be used to obtain and/or modify each one shown clearly.

Advanced Sync	Luma - Chroma Delay
Automatic Gain Control (Luma)	Manual Control of Sequences
Automatic Standards Selection	Mirrors
Background Colour	Mix
Bend	Move Control
Blinds	Move to Normal
Borders	Movement Effects On/Off
Channel Selection	Multigrab
Chroma Enhance	Normal Size & Position
Circle Function	Output Freeze Field Control
Clear Normal	Perspective Function
Colour Correction	Perspective in Movement
Component Input	Pixellation
Crease Function	Position of Picture
Crop Picture	Preset States Store & Recall
Drop Out Compensator	Preview (With B.I.M.)
Drop Shadow	Quantisation
Dub Input	Reset System
Effects	S-VHS Y-C Input
Error Freeze	Sequence Programming & Running
False Colour Imaging	Simple PAL
Flip	Size Adjustment
Fold	Skew Function
Freeze	Slide
General Purpose Interface	Software Version Display
Genlock	Source Selection
Horizontal Phase Adjustment	Speed of Moves & Sequences
Hue of Input	Standard Selection of Input
Input Black Level Setting	Subcarrier Phase Adjustment
Input Level Setting	Test Patterns
Input Timing (Position)	Thermal Shutdown
Inset Corner Moves	Tumble
Inversion	Warps
Joystick Control	Wobble
Key Input	Zoom



ADVANCED SYNC

The Advanced Sync signal can be turned On or Off (advanced one field or the same timing as the Reference/Main Output signal).

The default setting, which would normally be used, is Off. This is because the video delay through a P164 is either two or three fields (depending on the relative timing of the Input and Reference/Output signals). If the Input signal has approximately the same timing as the Output, the delay is at the minimum of two fields.

This signal can be fed to the sync (or Video) input of VTRs to standardise the timing through units in an editing system, and to maintain a constant one frame delay through the P164 effects unit.

The Advanced Sync signal is available from the socket on the Rear Panel of the P164; it is purely a sync signal, and has no colour burst on it.

To change the Advanced Sync setting:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) O/P (F2) AdvSy (F2)

The display will show 0 or 1, where 0 sets the Advanced Sync output to be the same as the Reference and 1 is one field advanced, selected by pressing button F2.

AUTOMATIC GAIN CONTROL (LUMA)

If a signal has been attenuated (by a long cable run, etc.), the system can be set to restore the Luma level, in relation to the Sync amplitude (assuming a nominal correct value of 0.3V); default setting is OFF.

Note that there is always automatic correction of the Chroma level (based on the Burst amplitude).

To set the Luma AGC to be ON:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) I/P (F1) OTHER (F4) Y AGC (F2)

Pressing Button 2 turns the Luma A.G.C. On and Off, as indicated on the LCD display.

See also: 'Input Level Setting'.

AUTOMATIC STANDARDS SELECTION

Automatic selection allows the unit to determine which standard is presented to the inputs. As it takes time to determine what the standard is, 'AUTO' should only be used when different T.V. standards are regularly being used. Setting (or 'Forcing' the input standard reduces the likelihood of a colour flash when a new input is selected or a drop-out is encountered).

P164 units of either output standard (PAL or NTSC) accept signals of all four input standards (PAL, SECAM, NTSC 3.58 & 4.43), acting as a Standards Converter. There is vertical interpolation, to smooth out the different number of lines. However, there is no time interpolation to compensate for the 50/60Hz difference, so there may be some jitter on fast moving images or horizontal pans.

PAL output units function normally in this way, accepting both types of NTSC signal. NTSC units, however, have their memory structured for 525-line pictures, so cut off the bottom 50 lines (approx) of the PAL or SECAM picture.

To set Automatic Standards Selection:

Press **SOURCE** to show Composite Input Selection on the display.

Press **Outline Up Arrow** **STAND (F4)** **AUTO (F2)**

The first letter of the word 'AUTO' will flash to indicate the selection.

See also 'Standards Selection of Input'.

BACKGROUND COLOUR

When the picture is less than full size, or partly moved off-screen, a Background colour is visible around it.

This does not apply if the output from the P164 is 'keyed' over another picture using either the Built-In Mixer or an external mixer, in which case the Background is replaced.

To change the Background colour:

Select 'Top Level' Menu - **CHOOSE FUNCT 1** (with Solid Up Arrow)

BGND (F2) **BGND (F2)**

The Joystick now controls the Background colour (Indicated by the 'Colour' LED below it becoming illuminated). Pressing the Joystick Function button sets it to control picture Size and Position (as indicated).

Up & Down - Adjusts the Background Luma (or brightness) Level.
Left & Right - Adjusts the Background Saturation (amount of colour)
Twisting - Adjusts the Background Hue (or which colour).

The values of Luma, Hue and Saturation are shown in the LCD Display.

See also 'Border' and 'Drop Shadow' (which are not replaced when keying the picture).

BEND

The two T-Bars can be set to provide different manipulation effects of the picture shape and size, collectively referred to as 'Bend' functions. Which ones are in use is shown on the display. Each of the functions can also be controlled more precisely with the Spinwheel - see the individual descriptions and 'Warps' for more details.

Press **BEND** button once:

T-Bar 1 = PERSPECTIVE
T-Bar 2 = CIRCLE (Horizontal)

Press **BEND** button twice:

T-Bar 1 = SKEW (Horizontal)

T-Bar 2 = CREASE (Horizontal)

Press **BEND** button 3 times:

T-Bar 1 = Horizontal Size
T-Bar 2 = Vertical Size

The T-Bars can be temporarily turned off with 'CE/C' (on Number Pad).

A fourth press of 'BEND' turns off the T-Bar functions.

See also: 'Perspective', 'Circle', 'Skew', 'Crease' and 'Size Adjustment'.

BLINDS

This effect is used when sliding the picture left and right, and is named after Venetian blinds. It takes different width bands of the picture and moves alternate bands in opposite directions.

The picture must be off-centre horizontally to see the effect - press Joystick Function button so that it controls Size and Position, and move a little to one side.

To adjust the size of Blinds:

Press **EFX** button (bottom right); display will show 'EFFECTS 1'

BLINDS (F4)

The Spinwheel now controls the thickness of the Blinds, as shown on the top line of the LCD display.

Blinds are turned off by setting the value to zero.

BORDERS

When the picture is less than full size, or partly moved off-screen, either one or two Borders can be set to surround it. Border 1 is the one on the outside, and Border 2 is inside. To remove a Border its size is set to be Zero. The thickness of the Border is related to the vertical size of the picture, unless you set a thin Border, in which case it is constant (independent of picture size).

If you wish the Border to replace some of the picture information (i.e. to be visible when the picture is not zoomed down to be smaller than normal), use the CROP function (see below); this enables the inner Border to come in to the active picture area. See also 'Background' and 'Drop Shadow'.

To change the Border sizes and colours:

Press **BORD** once to control Border 1 (outside)
Press **BORD** twice to control Border 2 (inside)

T-Bar 1 controls the size of Border 1, and T-Bar 2 controls Border 2; the sizes (or thicknesses) are shown on the top row of the LCD Display. The T-Bars can be turned off temporarily (to hold the current Border sizes) with the 'CE/C' button (in the Number Pad).

The Joystick now controls the colour of whichever Border is being set, as shown in the display (indicated by the 'Colour' LED below it becoming illuminated). Pressing the Joystick Function button sets it to control picture Size and Position (as indicated).

Up & Down - Adjusts the Border Luma (or brightness) Level.
Left & Right - Adjusts the Border Saturation (amount of colour)
Twisting - Adjusts the Border Hue (or which colour).

The values of Luma, Hue and Saturation are shown on the bottom row of the LCD Display.

The Border being controlled can be turned On and Off with **F1**. When the unit is first switched on, both Borders are On (to be ready for use); they then stay in whatever mode they are set. Note that if Border 2 (Inside) is set to Off, it is transparent. This enables Border 1 (Outside) to be spaced off from the edge of the picture information over the Background signal.

CHANNEL SELECTION

For two-channel systems, the P163 is connected to two P164 effects units. Each one is controlled individually for all functions, except for actually running Moves and Sequences.

They may be run on both channels if the BOTH button is set to ON.

To select each channel:

Press **CH 1/2** (upper centre section of panel).

Channel 1 is indicated by the Green LED being on, Channel 2 by the Red LED.

For a single channel system, use Channel 1 (Green LED).

CHROMA ENHANCE

The Chroma Edge Enhancement sharpens the edges of colours.

Note that this does not affect the Chroma level of the signal, but gives the appearance of increasing the Chroma bandwidth. It is particularly useful when the picture has been expanded.

To turn on the Chroma Edge Enhancement:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) **I/P (F1)** **OTHER (F4)** **CHR + (F3)**

See also: 'Input Level Setting'

CIRCLE FUNCTION

This approximately maintains the horizontal size of the top and bottom of the picture, and changes the middle horizontal size. The middle joins to the top and bottom with a curve which is part of a circle.

There are two ways of controlling the Circle function:

Press **BEND** once; (the display shows **PERSP** and **CIRCLE**).

Use T-Bar 2 to control the Circle function. The T-Bar can be turned off temporarily (to hold the current Circle value) with the 'CE/C' button (in the Number Pad).

For more accurate manipulation (for example to make the picture exactly fit over a particular part of the background image)

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

EFX (F3) **WARP (F1)** **CIRC (F4)**

The Spinwheel can now be used for fine control of the Circle function, the value is shown in the top line of the LCD display. 'CAL' (beside the Spinwheel) returns it to the normal setting.

See also: 'Bend' and 'Warps'.

CLEAR NORNAL

All the effects and manipulations of the picture can be reset to an internal calibrated normal setting.

The Borders and Drop Shadow, Mirrors and Inversion are turned off, the Source Selection is reset to Composite Input 1 and all controls are reset and turned off.

Press: **CLEAR NORM** (bottom left section of panel).

See also: 'Normal Size & Position'.

COLOUR CORRECTION

It is possible to correct some colour errors of the input picture, particularly the U/V ratio.

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) **I/P (F1)** **LEVELS (F1)** **GAIN (F2)** **U/V (F3)**

The Spinwheel is used to adjust the level, as shown in the display.

A low value makes a normal picture have a greenish tinge, and a high value makes it pink. 'CAL' (beside the Spinwheel) returns it to the normal setting.

Additional adjustments of the input levels are available, see also 'INPUT LEVEL SETTING'.

COMPONENT INPUT

Y U V Analogue or Digital Component input can be selected, for signals from a Betacam or MII source, for example. The signal is not filtered or decoded at the input to the effects unit, so gives better quality pictures.

To set **Y U V Analogue Input**:

Press **SOURCE** to show Composite Input Selection on the display,

Press **Outline Up Arrow** **Y U V (F3)** **ANALOGUE (F1)**

or press: **SOURCE** 7 (on Numerical Keypad)

The first letter of the word **ANALOGUE** on the display will flash, and the LED in button 7 will light to show the selection.

To set **Y U V Digital Input** (if the P164 is fitted with the Digital Input/Output option):

Press **SOURCE** to show Composite Input Selection on the display,

Press **Outline Up Arrow** **Y U V (F3)** **DIGITAL (F4)**

or press: **SOURCE** 8 (on Numerical Keypad)

The first letter of the word **DIGITAL** on the display will flash, and the LED in button 8 will light to show the selection.

See also: 'Source Selection'

CREASE FUNCTION

This maintains the horizontal size of the top and bottom of the picture, and changes the middle horizontal size. The middle joins to the top and bottom with a straight line.

There are two ways of controlling the Crease function:

Press **BEND** twice; (the display shows **SKEW** and **CREASE**).

Use T-Bar 2 to control the **CREASE** function. The T-Bar can be turned off temporarily (to hold the current Crease value) with the 'CE/C' button (in the Number Pad).

For more accurate manipulation (for example to make the picture exactly fit over a particular part of the background image):

Select 'Top Level' Menu - **CHOOSE FUNCT 1** (with Solid Up Arrow)

EPX (F3) **WARP (F1)** **CRSE (F3)**

The Spinwheel can now be used for fine control of the Crease function, the value is shown in the top line of the LCD display. 'CAL' (beside the Spinwheel) returns it to the normal setting.

See also: 'Bend' and 'Warps'.

CROP PICTURE

The active picture area can be reduced, enabling wide blanking (black lines down one or both sides of the picture) or head switching noise to be cut off.

Only the remaining part of the picture is manipulated in effects, etc. If the blanking is uneven it is possible to move the picture left and right with 'Input Timing' (see separate reference).

When the picture is cropped, the Inside Border (2) comes into the active picture area.

To Crop the picture:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

BGND (F2) CROP (F3)

T-Bar 1 now controls the Horizontal Crop, and T-Bar 2 the Vertical Crop.

The values are shown on the bottom line of the LCD display. The T-Bars can be turned off temporarily (to hold the current Crop values) with the 'CE/C' button (in the Number Pad).

DROP OUT COMPENSATOR

The Dropout threshold level can be set, for use with the internal Drop Out Compensator in the unit.

A lead must be connected from the Off-Tape RF signal of the VTR to the 'D/O RF' socket on the rear panel of the P164. The RF signal level going below the pre-set threshold level indicates a drop-out. A section from the previous line is repeated to cover the missing information. If there are a large number of drop-outs in a field, the previous field is displayed (whether or not the DOC switch is On - this effect can be reduced by setting the level to 255).

To modify the D.O.C. Threshold Level:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

Select Auxiliary menu - CHOOSE FUNCT 2 (with Right Arrow)

DOC (F4)

The DOC Clip Level can now be adjusted with the Spinwheel, and the value is shown on the top line of the LCD display.

If there is no R.F. signal connected to the rear panel of the P164, the Threshold Level should be set to 255.

DROP SHADOW

Outside the picture and any Borders that are switched on, a Drop Shadow can be displayed. It is always below the main image, and can be set to different sizes on either side. The Drop Shadow is only visible when the picture is smaller than unity size, or partly moved off-screen.

To change the Drop Shadow position and colour:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

BGND (F2) D.S. (F1)

T-Bar 1 controls the Horizontal size of the Drop Shadow and T-Bar 2 controls the Vertical size. The maximum setting of Vertical size gives a solid or 'fill-in' effect between the Drop Shadow and the picture. The values for the Horizontal and Vertical sizes are shown on the bottom row of the LCD Display.

The T-Bars can be turned off temporarily (to hold the current Drop Shadow size) with the 'CE/C' button (in the Number Pad).

The Drop Shadow forms part of the Output Key signal.

The Drop Shadow can be turned On and Off with button **F1**.

The Joystick now controls the colour of the Drop Shadow (indicated by the 'Colour' LED below it becoming illuminated).

Up & Down - Adjusts the Drop Shadow Luma (or brightness) Level.
Left & Right - Adjusts the Drop Shadow Saturation (amount of colour)
Twisting - Adjusts the Drop Shadow Hue (or which colour).

The values of Luma, Hue and Saturation are shown on the top row of the LCD Display.

Pressing the Joystick Function button sets it to control picture Size and Position (as indicated).

See also: 'Background' and 'Borders'.

DUB INPUT

The Dub signal from a 3/4-inch U-Matic VTR (High-Band or Low-Band) can be fed directly into the socket on the rear panel of the P164.

The luminance part of the signal is not filtered or decoded at the input to the effects unit, so gives better quality pictures. Remember that it is also necessary to connect a lead from the composite output of the VTR to the Video 2 BNC socket, to provide the chrominance signal.

In addition, the switch beside the connector should be set to HB or LB as appropriate for High or Low band signals.

To select DUB Input:

Press **SOURCE** to show Composite Input Selection on the display.

Press **Outline Up Arrow** **Y / C (F2)** **DUB (F4)**

or press: **SOURCE** **6** (on Numerical Keypad)

The first letter of the word DUB on the display will flash, and the LED in button 6 will light to show the selection.

See also: 'Source Selection' and 'S-VHS Y-C Input'.

EFFECTS

The term 'Effects' covers a lot of the functions of the unit. Many users consider the term to refer to movement, or a series of functions and moves strung together.

The MS83X series of systems has two types of movement effects, called 'Moves' and 'Sequences'.

Moves are controlled directly from the number pad when the MOVE button is enabled, and are always a straight-line transition between two points.

Sequences are a programmed series of 'Shots' (or Keyframes) which can include picture movement and other functions. There are ten Sequences (0 - 9) which can be programmed by the user, and over twenty which are pre-programmed Sequences provided with the system. These are run from the number pad to select the Sequence and 'ENTER' to make it run, when the SEQ button is enabled.

Both types of movement effect can be repeatedly run with the 'GO' button; Moves toggle (or swap) direction each time. Sequences do not. See the descriptions of each type for more details.

Some of the unit's non-movement effects can be selected with the EFX button; these include: Inversions, Mirrors, Tumbles, Wobbles, Blinds, False Colour Imaging. Quantisation and Pixelation.

See the summary of the EFFECTS menus (Section 3.5) and the individual alphabetical descriptions for more details.

ERROR FREEZE

The P164 unit contains Error Detection Circuitry which can freeze the last 'good' field of video before an error (missing or distorted syncs, etc.).

This enables the error to be 'masked', but it could also result in apparent jittery movement from poor quality video sources (VHS tapes, for example).

In addition, if a video signal is removed, the last field of the picture will be displayed until it (or another source) is reconnected.

To set the Error Freeze function:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) SYS (F3) ER-FRZ (F2)

This turns the function On and Off (as shown on the LCD display).

FALSE COLOUR IMAGING

A range of colours can replace the chroma information of the picture.

The actual colour displayed in each part of the picture is chosen according to the luminance (or brightness) at that point.

To set False Colour Imaging:

Press **EFX** button (bottom right) **TWICE**: display will show 'EFFECTS 2'

FCI (F1)

The Spinwheel now controls the False Colour Imaging selection, as shown on the top line of the LCD display.

The ranges of colours are as follows:

- 0 - Normal Colours
- 1 - Greens & Purples
- 2 - Yellows, Greens & Purples
- 3 - Subdued Greens & Sepia
- 4 - Blues
- 5 - Purples & Yellows
- 6 - Purples & Greens
- 7 - Yellows & Purples
- 8 - Monochrome
- 9 - Monochrome

FLIP

Any 'Move' (Slide, Fold or Zoom), or a movement between two shots of a programmed sequence, can have one, two or three Flips as the movement is performed. A Flip is a complete rotation about a central vertical axis, with the picture horizontally inverted in the middle of the Flip.

If it is set to '1', every move run will have a Flip until it is turned OFF again; similarly for '2' and '3'. When used in Sequences, the Flip(s) apply to the move **from** the Shot (or keyframe) in which the function is turned on to the next Shot. If a half-flip is required, then one shot should be set with 'Horizontal Invert' ON, so that the picture resets to normal by rotating half a turn about the central axis (see 'Inversion').

Moves can also have 'Tumble' (rotation about a horizontal axis), which can optionally include a 'Perspective' effect - see separate reference.

To set the Flip function:

Press **EFX** button (bottom right): display will show 'EFFECTS 1'

TUMB (F2) FLIP (F1)

Turns the Flip Function from Off to 1 2 or 3 (as shown).

See also: 'Move Control' and 'Tumble'.

FOLD

A Fold is one of the pre-set 'MOVES' of the unit. It can be run directly with the buttons on the Number Pad: the direction as indicated by the arrows on the buttons. Vertical Folds (buttons 8 & 2) perform a Fold between the current size and position and a zero height image along the top and bottom edges, without affecting the picture width. Horizontal Folds (buttons 4 & 6) go to a zero width image on the left and right edges, without affecting the picture height.

The Fold can have one or more Tumbles and/or Flips when running (by pressing EFX once and selecting **TUMB (F2)**), then turning on either **TUMB (F2)** or **FLIP (F1)** to show how many rotations will be performed during the Move). The Fold can be repeated with the GO button, swapping direction each time (as shown by the 'IN/OUT' button). For more details, see 'Move Control'.

When a Fold has been run 'Out' (so that the picture disappears), the 'Small Size' LED in the middle of the panel will be lit to indicate what has happened to the image.

To run a Fold:

Press **MOVE**, to show 'INSTANT MOVES' on the display.

Press **FOLD (F2)**, then Button **2 4 6** or **8** (on the Number Pad).

To adjust the speed:

Press **FNCTN** (beside Spinwheel), adjust Spinwheel for the required time (in frames) for the move, as shown on the top row of the LCD display.

The FOLD function also gives access to four Inset Corner moves, using the corner arrow buttons (1, 3, 7 & 9) in exactly the same way. This enables a move between the current size & position and one of four Inset Corner positions, which are designed to be useful for 'reveal' type effects. See 'Inset Corner Moves' for more details.

See also: 'Slide' and 'Zoom'

FREEZE

Three different types of Freeze are available.

INPUT FREEZE The normal setting is to freeze of the input video signal. This is a Field Freeze (without jitter), and it is interpolated vertically to give smoother edges and sloping lines. The frozen image can be manipulated, moved and zoomed. Three frozen fields can be viewed separately, or the freeze can use both input fields, see 'Output Freeze Field Control'.

OUTPUT FREEZE There are a few occasions on which the it may be required to freeze the Output; this prevents any movement of the picture.

BORDER FREEZE In addition, the Borders (or edge of the picture, if there are no Borders) can be locked at their present size and position, while allowing the picture to be moved and manipulated inside. This allows only a portion of the picture to be shown, by freezing the Border, then expanding the picture with the Joystick (see 'Size of Picture'). Note that if the picture is smaller than the Border, random data may appear.

To freeze the picture:

Press **FREEZE** or **GRAB**

To update the frozen picture : press **GRAB**, to unfreeze : press **FREEZE**.

Pressing either **FREEZE** or **GRAB** also gives access to the Freeze Options menu on the LCD Display.

To select Input Freeze, press **UP (F1)** (Frozen picture moved around)

To select Output Freeze, press **O/P (F2)** (Fixed Frozen picture)

To select Border Freeze, press **BORD (F3)** (Set Borders, moving picture)

The mode (or modes) of Freeze are indicated by an asterisk (*) beside the appropriate option on the LCD display.

Return to the previous menu that was in use can be achieved by pressing only the Outline Up Arrow (beside the LCD Display).

See also: 'Output Freeze Field Control' and 'Multigrab'.

GENERAL PURPOSE INTERFACE (G.P.I.)

The MS83X series of systems will accept a pulse into the P163's General Purpose Interface (G.P.I.) socket from an external unit (such as an edit controller) to start an effect (Move or Sequence).

The 'Go' G.P.I. of the P163 is the Red BNC of the two sockets on the 'Y' lead. It is actuated by connecting the contacts of the BNC together, or with an 'Active Low' TTL pulse.

The G.P.I. has exactly the same function as pressing the 'GO' button - for Moves it toggles (or swaps) the direction each time, and for programmed Sequences it always runs the same way (as set by the IN/OUT button).

If using an external edit controller, it will usually be necessary to reset the Move or Sequence to its start. For 'later' P163 units (with two BNC G.P.I.s on a 'Y' lead which plugs in at the rear) the Black connector is a 'Move to Start', and does this automatically if connected to the CEL P159 Edit Control Panel. Otherwise, for a Move - reset to start by pressing 'GO' (to run it backwards), or press: **IN/OUT. STOP.** For a programmed Sequence just press: **STOP.**

The 'Go' G.P.I. can be enabled and disabled with the **GPI** button (bottom left). It is enabled when the LED in the button is On.

GENLOCK

The Genlock can be turned on or off.

When it is ON (the normal state), the unit will 'Slave' to an external Black and Burst signal (from a Sync Pulse Generator, etc.) connected to the Reference Input on the rear panel.

Or it may be OFF, to self-run from its own internal SPG; it would then be the 'master' unit of a system.

To turn Genlock on and off:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) O/P (F2) GENLOCK on/off (F1)

See also 'Subcarrier Phase Adjustment' and 'Horizontal Phase Adjustment'

HORIZONTAL PHASE ADJUSTMENT

The output picture can be moved left and right (about $-1\mu\text{s}$ and $+2.5\mu\text{s}$) with respect to the appropriate standard Reference signal, if the unit is genlocked.

Note that the whole signal (including the sync pulses, etc.), is moved with this control.

To adjust the Horizontal Phase:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) O/P (F2) HSYNC (F4)

This enables the Spinwheel to control the Horizontal Phase, a numerical indicator of the value is shown on the top line of the display.

The CAL button (beside the Spinwheel) returns the setting to the nominal value.

See also: 'Genlock' and 'Subcarrier Phase Adjustment'.

HUE OF INPUT (NTSC)

If an NTSC input is selected the Hue can be adjusted by $\pm 30^\circ$:

To adjust the Hue:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) I/P (F1) LEVELS (F1) HUE (4)

The Spinwheel can then be used to adjust the Hue, a numerical indicator of the value is shown on the top line of the display.

The CAL button (beside the Spinwheel) returns the setting to the nominal value of zero.

See also: 'Subcarrier Phase Adjustment'.

INPUT BLACK LEVEL SETTING

The Luma and two colour difference components of the Black level of the input signal can be adjusted. This would enable correction of colour tinges in the black parts of a picture.

To modify the Black Level Settings:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) I/P (F1) LEVELS (F1) BLACK (F3) Y U or V

The Y, U or V setting can then be adjusted by pressing buttons F1, F2 or F3 and using the Spinwheel; a numerical indicator of the value is shown on the top line of the display.

The CAL button (beside the Spinwheel) returns the setting to the nominal value of zero.

INPUT LEVEL SETTING

The Luma (brightness) and Chroma (amount of colour) of the input video signal can be adjusted. This would make it possible to correct for wrong levels in the source material.

To modify the Input Level Setting:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) I/P (F1) LEVELS (F1) GAIN (F2) Y or CHROMA

Luma (button F1) and Chroma (button F2) can then each be adjusted with the Spinwheel; a numerical indicator of the value is shown on the top line of the display.

The CAL button (beside the Spinwheel) returns the setting to the nominal value of zero.

See also: 'Colour Correction'.

INPUT TIMING (POSITION)

The Horizontal and Vertical timing of the input pictures into the store of the P164 can be adjusted.

This enables compensation of wide blanking (black lines down one side of the picture) or head switching signals (particularly VHS, across the bottom), by centring the image on the screen. Differently timed signals can also be made to line up with each other.

To change the Input Timing:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) I/P (F1) TIMING (F2) H POS (F1) or V POS (F2)

It only gives a small range of adjustment with the Spinwheel for each direction, to correct for mis-timed input signals: a numerical indicator of the value is shown on the top line of the display.

The CAL button (beside the Spinwheel) returns the setting to the nominal value of zero.

See also: 'Crop'.

INSET CORNER MOVES

An Inset Corner Move is one of the pre-set 'MOVES' of the unit. The picture will move between its current size, shape and position to one of four locations at a pre-set size in each of the corners. It can be run directly with the buttons on the Number Pad; the direction as indicated by the arrows on the buttons. There are moves to each of the four corners, incorporated with the 'HOLD' function (because it is not possible to have a Corner Fold). These Inset Corner Moves are designed to be useful for 'reveal' type effects, by putting the picture in the corner to reveal an announcer or map, etc.

The Move can have Tumble and/or Flip when running (by pressing EFX once and selecting **TUMB (F2)**), then turning ON either **TUMB (F2)** or **FLIP (F1)**. The Move can be repeated with the GO button, swapping direction each time; or, the direction can be set with the 'IN/OUT' button. Note that when moving 'IN' (from small-size to full-screen), the picture comes back to exactly where it was before being moved 'OUT', so any changes made while it was small-size will be restored to their previous settings.

For more details, see 'FOLD' and 'MOVE CONTROL'.

To run an Inset Corner Move

Press **MOVE**, to show 'INSTANT EFFECTS' on the display.

Press **FOLD (F2)**, then Button **1 3 7** or **9** (on the Number Pad).

To adjust the speed:

Press **FNC"TN** (beside Spinwheel), adjust Spinwheel for the required time (in frames) for the move, as shown on the top row of the LCD display.

INVERSION

The picture can be inverted horizontally or vertically, to give a complete mirror-image left to right or top to bottom. These are equivalent to horizontal or vertical scan reversal of a camera or monitor. The picture can still be moved around and manipulated in the normal way.

To set the Horizontal Invert function to be On:

Press **EFX** button (bottom right): display will show 'EFFECTS 1'

INVT (F1) H INV on/off (F1) Turns the Function On and Off (as shown).

To set the Vertical Invert function to be On:

Press **EFX** button (bottom right): display will show 'EFFECTS 1'

INVT (F1) V INV on/off (F2) Turns the Function On and Off (as shown).

See also: 'Mirrors', 'Flip' and 'Tumble'.

JOYSTICK CONTROL

The three-axis Joystick enables control of different functions.

The most common function is picture size and position. This function is turned on by pressing the 'FNCTN' button beside the Joystick, as shown by the 'Size/Position LED being on. The size is adjusted by twisting the Joystick (clockwise to increase, anti-clockwise to decrease). The position is simply set by moving the Joystick left & right or up & down to move the picture horizontally or vertically. Letting go of the Joystick will leave the size and position at the values they have reached.

The Joystick is also used to set the colour of the Borders, Drop Shadow and Background: it becomes 'live' to this function when one of them is being set (see the relevant descriptions). The Joystick can be returned to controlling size and Position by pressing the FNCTN button (as above). When being used to control colours, the 'Colour' LED below it is illuminated, and the controls are as follows:

Up & Down	-	Adjusts the Luma (or brightness) Level
Left & Right	-	Adjusts the Saturation (amount of colour)
Twisting	-	Adjusts the Hue (or which colour)

The values of Luma, Hue and Saturation are shown on the LCD Display.

See also: 'Size Adjustment', 'Position of Picture', 'Borders', 'Drop Shadow' and 'Background Colour'.

KEY INPUT

The Input Key connected to the P164 allows only part of the input video picture to be selected for manipulation. This could be with the signal from a caption camera, or the Key (or 'Edge') output from a graphics generator. The signal must be positive-going (i.e. a white image on a black background). This facility enables irregular or circular shapes to be used, avoiding the very 'Rectangular' look of some effects. The Key signal is processed with the video signal, and must be exactly synchronous with it. The Output Key signal from the P164 will be a combination of the Input Key signal with any picture manipulations.

To turn the Input Key On and Off:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)
Select Auxiliary menu - CHOOSE FUNCT 2 (with Right Arrow)

KEY (F3) OFF/ON (F1)

To set the Input Key to be a variable Video Level (as set with KEY CLIP, see below), or TTL Level - for use with the Key output from a computer etc.:

CHOOSE FUNCT 2 (As Above) KEY (F3) VIDEO/TTL (F2)

The KEY DELAY can be adjusted (to compensate for different relative delays in the video path, particularly between Composite and Component inputs):

CHOOSE FUNCT 2 (As Above) KEY (F3) DELAY (F3)

It gives a range of 0 to 2.4 μ s, with the spinwheel.

The KEY CLIP LEVEL can be adjusted, to 'Slice' according to the luma level of the Input Key signal:

CHOOSE FUNCT 2 (As Above) KEY (F3) CLIP (F4)

It gives a range of 0V to 0.7 (the complete video magnitude), with the Spinwheel; the value is shown on the top row of the LCD display with a range of 0 to 255. The CAL button (beside the Spinwheel) returns the setting to the mid-range setting of 128 (about 0.35V).

LUMA - CHROMA DELAY

The Horizontal and Vertical Luma/Chroma delay can be adjusted.

This advances or retards the Chroma signal to compensate for mis-adjusted VTRs. The horizontal range of ± 32 steps of 74ns Pixels (or a total range of $\pm 2.4\mu$ s); negative values make the chroma earlier (to the left), positive values make it later.

Note that the full negative and positive range is only available when the Vertical Y-C delay is greater than Zero.

The vertical offset of 0, 1 or 2 lines compensates for multiple PAL or SECAM decoding which progressively moves the chroma downwards. The correction provided by this control enables it to be moved up again.

To adjust the Horizontal Luma - Chroma Delay:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) I/P (F1) TIMING (F2) H y/c (F3)

To adjust the Vertical Luma - Chroma Delay:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) I/P (F1) TIMING (F2) V y/c (F4)

In each case the Y-C delay can then be adjusted with the Spinwheel; a numerical indicator of the value is shown on the top line of the display.

The CAL button (beside the Spinwheel) returns the setting to the nominal value of zero.

MANUAL CONTROL OF SEQUENCES

A programmed sequence can be run through manually. This is useful for seeing how each part of the sequence fits together.

To Manually move through a Sequence:

Press: **MAN SEQ** (Beside the T-Bars).

T-Bar 1 now moves through the current programmed Sequence or Move, i.e. the last one that was run, from beginning to end.

Note that if it is a long and complicated Sequence, some of the movement will occur in 'steps', because the T-Bar only has 256 possible settings. The T-Bar can be turned off temporarily (to hold the current position) with the 'CE/C' button (in the Number Pad).

See also: 'Sequence Programming' and 'Move Control'

MIRRORS

The picture can be a mirror-image horizontally or vertically.

Horizontal Mirror gives a reflection of the left-hand half of the picture in the right-hand section of the screen. Alternatively, the right-hand half can be reflected by using Horizontal Invert as well (see above). The Mirror-line is always in the middle of the picture, and the image is locked to the centre of the screen (it cannot be moved left and right with the Joystick).

Vertical Mirror gives a reflection of the top half of the picture in the bottom half of the screen. The mirror-line is in the centre of the image, and the whole image can be moved around the screen..

To set the Horizontal Mirror function to be On:

Press **EFX** button (bottom right); display will show 'EFFECTS 1'

INVT (F1) H MIR on/off (F3) Turns the Function On and Off (as shown).

To set the Vertical Mirror function to be On:

Press **EFX** button (bottom right); display will show 'EFFECTS 1'

INVT (F1) V MIR on/off (F4) Turns the Function On and Off (as shown).

See also: 'Inversion'.

MIX

For MS831 and MS832 systems (which include a Built-In Mixer (B.I.M.)), the different 'Layers' can be mixed (dissolved) up and down. Channel 1 is normally Layer 1, Channel 2 (if fitted) is Layer 2, Channel 3 could be an external Character Generator (for example). The default power-on setting is that these all appear in that order over the Background Video (as connected to the rear of the Channel 1 P164).

The initial 'Default' settings of the mixer configuration are as follows:

Press 'MIX' (beside T-Bars).

Press MIX once: T1 = Fade Layer 1 up & down T2 = Fade to Black

Press MIX twice: T1 = Fade Layer 2 up & down T2 = Fade to Black

Press MIX 3 times: T1 = Fade Layer 3 up & down T2 = Fade to Black

MIXING

The layers being mixed are indicated by an asterisk (*) beside the layer name on the LCD display. Once a layer has been mixed Up or Down, it stays at that setting. This means that Layer 3 can be mixed Up, then Layer 1 or 2 controlled with the T-Bars. The T-Bars can be turned off temporarily (to hold the current Mix value) with the 'CE/C' button (in the Number Pad).

After pressing 'MIX' once, it is also possible to control either or both of the other two layers (as well as Layer 1). Operating two layers in the same direction enables both pictures to be faded away (Channels 1 & 2 over Channel 3, for example). Operating them in opposite directions means that T1 provides a cross-fade from Layer 1 to Layer 2.

Press F1 once: T1 = Layer 1 Up & Layer 2 Up (Display shows L2 *)

Press F1 twice: T1 = Layer 1 Up & Layer 2 Down (Display shows L2 rev*)

Press F3 once: T1 = Layer 1 Up & Layer 3 Up (Display shows L3 *)

Press F3 twice: T1 = Layer 1 Up & Layer 3 Down (Display shows L3 rev*)

After pressing 'MIX' twice, it is also possible to control Layers 1 & 3 (as well as Layer 2); this is done in exactly the same way.

MIX (Continued)

CHANNEL ORDER

The order of the Channels (i.e. which Channel is assigned to each Layer) can be changed. The three layers appear over the Background, if they each have a key signal which is smaller than the full screen.

Whenever the 'MIX' button LED is On, Press: Left Arrow (beside Display)
The Display will show which Channel is assigned to the 1st, 2nd & 3rd layers

Press: F1 to change what Channel is assigned to the 1st (top) layer

F2 to change what Channel is assigned to the 2nd (middle) layer

F3 to change what Channel is assigned to the 3rd (lower) layer

Note that when changing the channel assignments, it is possible to set an illegal combination (i.e. Channel 2 set on Layer 1 and Layer 2). Ensure that you also change the setting for the remaining Layers.

To return to the Mix menu, press Right Arrow (beside the LCD Display).

KEYING OF CHANNELS

The Channel 1 Key is connected internally, and is normally set to 'ON' so that the active picture area (plus any Borders) can 'fly' over the pictures behind it, when being Zoomed or manipulated, etc. It can also be turned 'OFF' (so that Channel 1 will not appear), or set to 'FULL' so that it fills the whole screen (including the set Background colour of Channel 1). Channel 1 is the P164 that includes the B.I.M. (or the only one in a single-channel system).

Channel 2 Key only accepts a TTL Level signal into the B.I.M., so should only be used for a second P164 (if included in the system). It is also normally set to 'ON', but may be turned 'OFF' or set to 'FULL'.

MIX (Continued)

The Key signal for Channel 3 can be set to be a Video level (with a set Slice level), TTL level, Linear (or analogue) key (with soft edges) or Self-Key (using the video signal itself as a Key source). Whichever type of Key signal is in use for Channel 3, it can be set to 'ON', 'OFF' or 'FULL', as above.

Whenever the 'MIX' button LED is On, Press: **Right Arrow** (beside Display) The Display will show whether the Keys for each Channel are set to ON, OFF or FULL.

Press: **F1** to change the setting of Channel 1 Key ('on' 'off' or 'full')
F2 to change the setting of Channel 2 Key ('on' 'off' or 'full')
F3 to change the setting of Channel 3 Key ('on' 'off' or 'full')

Press: **F4** to access the Channel 3 Key signal options:

Then press **F1** to select the Key of Channel 3 to be one of these options:

VIDEO Picture will be shown when the Key signal (internally terminated with 75 Ohms) is above the Slice level, as set by pressing F3 and adjusting with the Spinwheel.

T T L Gives Key 'On' for a level above approximately 0.5V (not terminated internally) - based on computer TTL level.

LINEAR Sometimes called 'Analog'. Transparency of Channel 3 is set by the level of Key 3 input (which is internally terminated: Black = Transparent, Mid Grey = Half-Mix, White = Fully On).

SELF Similar to 'Linear', but using the Channel 3 Video signal as the Key source, rather than the Key 3 Input.

Return to the Key menu is with the Right Arrow Button, or to the Mix menu with Left Arrow.

MOVE CONTROL

There are three different types of pre-set 'MOVES' provided by the MS83X systems: SLIDES, FOLDS and ZOOMS. Each type can be run directly with the buttons on the P163 Number Pad; the direction is indicated by the arrows on the buttons.

The Moves can be run repeatedly with the 'GO' button, swapping direction each time, as indicated by the LEDs in the IN/OUT button. When moving OUT, the picture goes from its current size, shape and position to pre-set sizes or positions (see below). When moving IN, the picture returns to its previous size, shape and position, from wherever it is selected to move. The state of the Borders, Drop Shadow, Input Selection and Setups, etc. are not affected, but remember that pressing the GO button will run the last move exactly as the set-up then was. A Move To Normal is also possible (see under separate heading).

SLIDE - Sets the default positions to which the eight Number Pad buttons (1 to 9, except 5) move the picture, as the four corners and the centre of each edge. The size and shape of the picture is not affected.

ZOOM - Sets the default sizes and positions that the nine Number Pad buttons (1 to 9) move the picture to as the centre of the screen, the four corners and the centre of each edge. The size that it ZOOMs to is zero.

FOLD - Vertical Folds (buttons 8 & 2) perform a Fold between the current size and position and a zero height image along the top and bottom edges, without affecting the picture width. Horizontal Folds (buttons 4 & 6) go to a zero width image on the left and right edges, without affecting the picture height. In both cases, the shape of the picture is 'squashed' appropriately.

The FOLD function also gives access to four INSET CORNER moves, using the corner arrow buttons (1, 3, 7 & 9) in exactly the same way. This enables a move between the current size & position and one of four Inset Corner positions, which are designed to be useful for 'reveal' type effects.

MOVE CONTROL (Continued)

To run a MOVE:

Press **MOVE**, to show 'INSTANT MOVES' on the display.

Press **SLIDE (F1)**, **FOLD (F2)** or **ZOOM (F3)**

Then press one of the Number Pad Buttons, to run the Move in the direction indicated by the arrows. Note that Moves can run Out (from Current size) or IN (back again). Note that when moving 'IN', the picture comes back to exactly where it was before being moved 'OUT', so any changes made while it was off-screen will be restored to their previous settings.

For all three types, a Move To Normal can be run with Number Pad button 0.

The Move can be repeated with the GO button, swapping direction each time (as shown by the 'IN/OUT' button). To reset a Move to its start, either press **GO** (to run it backwards), or press **IN/OUT** and **STOP**.

To adjust the speed of the move:

Press **FNCTN** (beside Spinwheel), adjust Spinwheel for the required time (in frames) for the move, as shown on the top row of the LCD display. The maximum time for a Move is 300 frames (12 seconds for PAL, 10 sec for NTSC). Note that there are different times stored for running Moves and Sequences, the one adjusted in this manner can be returned to after running a Sequence.

Any Move (Slide, Zoom or Fold) can have a Flip or a Tumble as it moves. A Flip is a complete rotation about a central vertical axis, and a Tumble is a complete rotation about a horizontal axis. With Tumble it is possible to have a Perspective effect as it rotates; this makes the picture appear to be tumbling away from the viewer.

To set the functions to be On:

Press **EFX** button (bottom right); display will show 'EFFECTS 1'

TUMB (F2) **FLIP (F1)** Turns the Flip Function On and Off (as shown).
TUMB (F2) **TUMB (F2)** Turns the Tumble Function On and Off (as shown).
TUMB (F2) **PERSP (F3)** Turns the Perspective in Tumble Function On and Off (as shown):- only works if Tumble is On.

MOVE TO NORMAL

A Move from the current size, shape and position to full-size normal can be run.

This does not affect the Borders, Input Selection and Setup, etc. It will run with any Flips or Tumbles that are currently turned On, and at the speed as set with the Spinwheel (in Frames).

The Move direction is set by the IN/OUT button, In = from Current to Full Size.

To Move the Picture to Normal Size:

Press: **MOVE**

Check IN/OUT button is set to 'IN'

Press: **0** (Zero on Number Pad)

See also: 'Normal Size & Position' and 'Clear Normal'.

MOVEMENT EFFECTS ON / OFF

The picture manipulation movements can be turned off. This enables Wipes to be achieved by moving the Key Window, leaving the picture itself full-size.

All of the effects and manipulations can be applied to the size and shape of the Key, in the same way as the picture can normally be controlled. Thus it is possible to have Horizontal and Vertical wipes by Sliding the picture on and off; or circular wipes by using the 'Circle' and 'Horizontal Size' controls together.

Turning the Movement Effects on and off can be included in a Sequence, for example to provide a mixture of Digital Effects and Wipe Patterns. Note that this function always resets to 'On' when switching the unit on or when 'Clear Normal' is pressed.

To turn off the Movement Effects:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) SYS (F3) MV-FX (F1)

This turns the Movement Effects On and Off (as shown on the LCD display).

MULTIGRAB

A Multigrab (or 'Strobe') function is available, to make the picture freeze periodically at user-defined intervals, to give the appearance of intentional 'judder' in any movement of the picture.

This function is used with the 'Freeze' control, such that the unit repeatedly updates the frozen picture with a new one after a set number of frames. It is equivalent to manually pressing the GRAB button at intervals. The type of freeze currently selected (Input or Output) will be used for the Multigrab.

To operate Multigrab:

Press **FREEZE**

Press **FNCTN** (beside Spinwheel), adjust the Spinwheel for the required time (in frames) between each update of the picture.

Note that a time of Zero (the default setting) gives a continuously frozen image. It may also be necessary to select the different field output possibilities with the Output Freeze Field Control menu, to compensate for any apparent jitter on the output.

See also: 'Freeze' and 'Output Freeze Field Control'

NORMAL SIZE & POSITION

The picture can be reset full-size, centre-screen with no picture manipulations. The Borders and Drop Shadow, Mirrors and Inversion are left as they were, the Input Setup and Source Selection are unaffected and any controls that were in use remain On.

To make the picture immediately go to Normal Size:

Press: **NORM SIZE** (bottom right section of panel).

Other 'NORMAL' functions are available, to set only the picture to full size or just the position to centre-screen. These are particularly for use when making fine adjustments to the size, shape or position of the picture with the Spinwheel. No other functions or settings are reset.

To set Normal Size (only):

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

EFX (F3) **SIZE (F3)** **NORM (F4)**

To set Central Position (only):

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

EFX (F3) **POSN (F2)** **NORM (F4)**

See also: 'Clear Normal' and 'Move To Normal'.

OUTPUT FREEZE FIELD CONTROL

When the picture is Frozen with an Input Freeze, the Output of the system can be set to be made up of either one or both fields of the input signal. In addition, individual fields of the three held in the 'Input Store' can be displayed separately.

To select whether the frozen output is made up of both of the fields of the input signal, or just the last one (normal state):

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

Select Auxiliary menu - CHOOSE FUNCT 2 (with Right Arrow)

OUT (F1) **BOTH (F1) or LAST (F2)**

This status will be held for any subsequent freezes. When the unit is switched off or 'Clear Norm' is pressed, it resets to 'LAST'.

To select the separate frozen fields:

Press: **FREEZE** (Display shows 'Freeze Options', check I/P is selected)

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

Select Auxiliary menu - CHOOSE FUNCT 2 (with Right Arrow)

OUT (F1) **SELECT (F3) + (F4)**

Steps through the three frozen fields, as shown on the display; these can also be selected with the Spinwheel. If 'Freeze' is pressed again, the Display returns to the 'Freeze Options' menu; return to the 'Freeze O/P Field' menu can be achieved by pressing only the Outline Up Arrow (beside the Display).

See also: 'Freeze'

PERSPECTIVE FUNCTION

This maintains the horizontal size of the middle of the picture, and changes the ratio of the length of the top edge to the bottom edge, joining the two with a straight line. It is possible to get the top or bottom edge of the picture to 'swap over', making part of the picture become a distorted mirror-image.

There are two ways of controlling the Perspective function:

Press **BEND** once; (the display shows **Persp** and **CIRCLE**).

Use T-Bar 1 to control the Perspective function. The T-Bar can be turned off temporarily (to hold the current Perspective value) with the 'CE/C' button (in the Number Pad).

For more accurate manipulation (for example to make the picture exactly fit over a particular part of the background image):

Select 'Top Level' Menu - **CHOOSE FUNCT 1** (with Solid Up Arrow)

EFX (F3) **WARP (F1)** **Persp (F1)**

The Spinwheel can now be used for fine control of the Perspective function, the value is shown in the top line of the LCD display. 'CAL' (beside the Spinwheel) returns it to the normal setting.

PERSPECTIVE IN MOVEMENT

Any 'Move' (Slide, Fold or Zoom), or a movement between two shots of a programmed sequence, can have a Tumble with one-dimensional Perspective as the movement is performed.

This is a complete rotation about a central horizontal axis, with Perspective added to make the top of the picture appear to tumble away from the viewer (when moving 'In' or Forwards in a Programmed Sequence). The picture is inverted in the middle of the Tumble.

If the function is set to 'ON', every move run will have a Tumble with Perspective until it is turned OFF again. When used in Sequences, the Tumble applies to the move from the Shot (or keyframe) in which it is turned on to the next Shot. If a half-tumble with Perspective is required, then one shot should be set with 'Vertical Invert' ON with some Perspective added (see separate reference to 'Perspective Function'), so that the picture resets to normal by rotating half a turn about the horizontal central axis (see 'Inversion').

Moves can also have 'Flip' (rotation about a vertical axis), or can have 'Tumble' without Perspective - see separate references.

To set the Perspective in Tumble function to be On:

Press **EFX** button (bottom right); display will show 'EFFECTS 1'

TUMB (F2) **TUMB 1, 2 or 3 (F2)** **Persp on (F3)**

PIXELLATION

The picture can be pixellated in squares of varying sizes. Each 'tile' has the luma level (brightness) and colour of the pixel which was at the centre of the tile from the original picture. Thus an apparent 'averaging' can result.

Note that the Pixellation is carried out at the Output of the P164, so Zooming the picture up or down does not affect the size of the squares.

The maximum square size is 64 x 64 pixels, which means that the screen is made up of approximately 11 x 9 squares. The minimum size is two pixels.

'Defocus' can be achieved with the minimum Pixellation setting (value of 1) which gives a softer appearance. This can be useful when expanding the picture.

To set Pixellation:

Press **EFX** button (bottom right) **TWICE**; display will show 'EFFECTS 2'

PIX (F3)

The Spinwheel now controls the Pixellation level (size of squares), with a range of 0 (off) to 127 (maximum). The value is shown on the top line of the LCD display.

'CAL' (beside the Spinwheel) sets the Pixellation to a mid-range value.

POSITION OF PICTURE

The picture can be moved around the screen; also it can be moved off-screen, even if it is up to twice normal size.

The horizontal and vertical position can be set independently - either with the Joystick, or (for greater accuracy and repeatability), the Spinwheel. When the picture has been moved (in either direction) so that its centre is outside the active screen area, the 'Off Screen' LED in the middle of the panel will be lit to indicate what has happened to the image.

To set the Joystick to control the picture position:

Press: **FNCTN** (beside Joystick)

The 'Size/Posn' LED below the Joystick is now lit, and moving it Left & Right or Up & Down adjusts the horizontal or vertical position. Note that twisting the Joystick also adjusts the size of the picture.

For more accurate positioning (for example to make the picture exactly fit over a particular part of the background image):

Select 'Top Level' Menu - **CHOOSE FUNCT 1** (with Solid Up Arrow)

EFX (F3) **POSN (F2)** **HPOS (F1)** or **VPOS (F2)**

The Spinwheel can now be used for fine control of the horizontal or vertical position of the picture. The value is shown in the top line of the LCD display; this can be noted for return to exactly the same position at a later time.

'CAL' (beside the Spinwheel) returns the picture to the central position of whichever direction was being adjusted.

'NORM' (F4) centralises the picture and turns off the position function.

PRE - SET STATES STORE & RECALL

Four settings of the entire status of the unit (or both units, in a two-channel system) can be stored for later recall (even after power-off). Recall of the User States is very simple, and there is also the option of recalling a Factory Preset State.

The four User States enable the current status of the P164 to be put into memory. This includes the Video Input levels, the Delays, selected input, etc., as well as the picture size, shape & position and Border colours. Each User State can be set up according to a particular Input and VTR, or even a particular section of tape.

The Factory Preset restores all the settings of the P164 to the preset values, which will return the unit to normal calibration.

To Store a User Preset State, set up the desired picture parameters:

Press: **PRE SET** (below Number Pad buttons)

Press: **ENTER** and **1 2 3** or **4** to Store it into the non-volatile memory.

To Recall a User or Factory Preset State:

Press: **PRE SET** (below Number Pad buttons)

Press: **1 2 3** or **4** to recall a User State or **0** for the Factory Preset

Pressing the appropriate Number Pad Button causes the flashing LEDs to stop and the set User State number to remain lit, until another function is used.

See also: 'Reset System'.

PREVIEW (WITH B.I.M.)

On MS831 and MS832 systems, which include a P164 with B.I.M. (Built-In Mixer) Card, it is possible to select different Video Inputs and Key signals. These are displayed via the 'Preview' output of the Channel 1 P164 (the top socket of the extra set of BNC connectors on the rear panel).

The four video inputs can be viewed, plus the key signal associated with the first three of them; note that the Background cannot be keyed over anything else.

The normal state of the Preview output is 'Programme', such that it is showing the same signal as the main system video output (from the Main Video Output socket of channel 1). This is useful when using the system for editing, such that the 'Main' feed goes to the record VTR, with 'Preview' connected to a video monitor; the monitor normally shows what is about to be recorded.

To Preview one of the Video Sources:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

PVW (F1) Vid 1 (F1) 2 (F2) 3 (F3) or BGND (F4)

For Channel 1 (the unit including the B.I.M.). Channel 2 (of a two-channel system), External Channel 3 (a caption generator or camera, etc.) or the Background video input (which always appears behind all other pictures).

To Preview one of the Key Sources:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

PVW (F1) Press the **Right Arrow** (beside the Display)

Key 1 (F1) 2 (F2) 3 (F3)

The Key for each of the three channels will be shown as a white image on a black background. This indicates to the mixer where the active video picture for that channel is located on the screen. The Key signal may also be used to feed external equipment, such as downstream video mixers, from the 'KEY O/P' socket on the rear of the P164.

To Preview the Programme Output (normal setting):

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

PVW (F1) Press the **Right Arrow** (beside the Display)

PROG (F4)

See also: 'Mix'.

QUANTISATION

This effect is sometimes referred to as Posterisation or Solarisation.

It gives an apparent banding of contrast levels by reducing the number of bits of digital information used in the picture's output Luma (or brightness) signal. It does not affect the colour information at all.

To set Quantisation:

Press **EFX** button (bottom right) **TWICE**; display will show 'EFFECTS 2'

QUANT (F2)

The Spinwheel now controls the level of Quantisation, as shown on the top line of the LCD display.

The range of 0 - 15 turns off each of the eight bits of the luma video signal (starting with the lowest bit) every two steps. The higher of each pair of steps sets the same Quantisation levels of the input signal as the lower step, but at a greater video level (half a step higher).

RESET SYSTEM

All the settings and Pre-Set Stores of each P164 can be restored to their factory calibrated values. The Reset function also performs a 'Clear Normal' of the P163 Control Panel (see separate reference).

The Reset will over-ride any adjustments of the system (picture size & position, video levels, Border colours, etc.) that have been made. It is like a 'Hard Reset', erasing the non-volatile memory of the P164, so is a much more complete initialisation of the system than simply turning off the power of the system.

Note that this function erases any Pre-Set States that have been stored (see separate reference). It should only be used if somehow the data in the State Stores has become corrupted, causing the picture output to be distorted or frozen. Any user-programmed sequences in the P163 control panel will not be affected by this Reset.

To Reset the System:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) SYS (F2) RESET (F4)

This sends the Reset command to the currently selected P164 channel, and restores the display to be 'Choose Function 1'. Wait until the 'Clear Norm' LED has flashed (about two seconds) before operating the system again.

See also: 'Pre-Set States'.

S-VHS Y-C INPUT

The Y-C (Luminance and Chrominance) signal from a 1/2-inch S-VHS VTR can be fed directly into one of the two sockets on the rear panel of the P164. The lead supplied with the S-VHS machine may be four-pin or seven pin, either socket can be used. In addition, the switch beside the connectors should be set to 'YC' for S-VHS signals. It is not possible to have S-VHS and U-Matic Dub signals connected at the same time.

The luminance part of the signal is not filtered or decoded at the input to the effects unit, so gives better quality pictures.

To select S-VHS Y-C Input:

Press: **SOURCE** to show Composite Input Selection on the display.

Press Outline Up Arrow Y / C (F2) S-VHS (F1)

or press: **SOURCE** 5 (on Numerical Keypad)

The first letter of the word S-VHS on the display will flash, and the LED in button 5 will light to show the selection.

See also: 'Source Selection' and 'Dub Input'.

SEQUENCE PROGRAMMING & RUNNING

A Sequence is a series of Moves and Effects which can be simply programmed by the user. There is space for ten user-programmed sequences to be stored in the memory of the P163. In addition, there are 26 pre-programmed sequences provided with the system, which can be accessed directly from the control panel; these ones cannot be modified.

The method of programming is by storing a number of Shots (or Keyframes) which the picture then moves between. The movement is either in Curves, Straight Lines or Steps. A Sequence can be a single straight-line move between two shots, or a longer and more sophisticated series of shots (up to a maximum of 28), changing other features (such as the Mix State, Input Level setting, Border, etc.) as the Sequence progresses.

The buttons to program and modify sequences are grouped together in the middle of the control panel. These enable the user to Insert shots (create new ones), Replace (change) existing shots, or Delete (remove) shots from a Sequence. In addition, it is possible to step forwards and backwards through a Sequence one shot at a time with the 'Next' and 'Prev' buttons.

Every parameter of the picture set-up and position is stored in a Sequence. Only changes are recorded at each shot, so to modify a setting for the whole Sequence, only Shot 1 needs to be changed. Similarly, any changes made in the middle of a Sequence will stay set for the rest of it. This applies to all settings, but is particularly relevant to: Source Selection, Border Size & Colour, Crop value, Video Levels, etc.

Each move of a Sequence can be Curved, Linear or Stepped. Curved moves make a 'Best Fit' through four points; these are the two shots at either end of that move, the shot before and the shot after. If it is a move to the last shot of a Sequence, the unit 'invents' another shot (identical to the last one) to generate a smooth curve. The picture always passes exactly through every programmed shot. Linear moves are a straight line between two programmed shots. A Curved move before or after a Linear one 'fits' onto the end of the straight line. A Step move waits at the shot at the start of it for the set time of that shot, then 'jumps' to the next shot.

NOTE: All the settings which control the type of movement and time taken for a move between two shots are set in the shot at the start of the move.

SEQUENCE PROGRAMMING & RUNNING (Continued)

For two channel systems, the position of each channel is set individually; when both are in the desired place and with appropriate settings, the Shot is programmed.

PROGRAMMING A SIMPLE SEQUENCE

Press: **LEARN** - The Number Pad LEDs flash to prompt you to select one

Press **1** (in the Number Pad) - The Sequence Control buttons now flash. The display shows the Sequence number selected, the current shot number, the number of shots in the Sequence and 'Shot Options' selection. If it does not show 'SHOT 0 of 0' (a blank Sequence), press another Number Pad button.

Press **SHOT OPTIONS (F4)** **LINEAR (F2)** to set a linear move.

Press **FNCTN** (beside the Joystick). Twist the Joystick to the left to reduce the picture size and put it in the top left hand corner.

Press **INSERT** - The Sequence Control buttons will stop flashing for a moment. Also notice that the display has been updated to show that one shot has just been programmed.

Now move the picture to the right-hand side of the screen with the Joystick. Press **INSERT** - Shot 2 has been entered, and you have programmed your first Sequence.

To run the Sequence, press: **'SEQ'**. Number Pad button **1**, and **'ENTER'**.

EDITING A SEQUENCE

Press **LEARN** and Number Pad Button **1** - the display shows that the unit is set at the last Shot of Sequence 1. Additional shots can be added (with **'INSERT'**), and you can step back through the previous shot(s) with **'PREV'**, then forwards with **'NEXT'**. New shots are added after the Current Shot.

Any modification made to parameters of a shot is stored with **'REPLACE'**.

The time taken for a move between to shots can be changed as follows:

Select the shot at the **beginning** of the move.
Press **FNCTN** (beside Spinwheel) - the Display shows the Shot time.
Adjust the time (in frames) with the Spinwheel, then press **REPLACE**.
Note that there is a programed time for the last shot of a Sequence, before any further control from the panel is possible, or which causes the unit to 'wait' before running a Sequence backwards. Therefore, set the time for the last shot to be 1 frame.

The type of move can be changed:

Select the shot at the **beginning** of the move, then from the Edit menu Press **Shot Opts (F4)** and select **STEP (F1)**, **LINEAR (F2)** or **CURVED (F3)**.
The initial setting is **CURVED**, then whichever type is selected will stay set for the rest of the Sequence.

When programming Sequences with Curved moves, the movement between each shot 'flows' together. Sometimes this may cause the picture to move away from the expected path; if this is the case, edit the Sequence and change the position of the appropriate shot (or shots), then press 'Replace'.
Because the Curved move function uses an extra (imaginary) shot after the end of the Sequence, set the last shot to 'LINEAR' to prevent unexpected 'settling' at the end (as well as setting the Shot Time to 1).

To make the picture 'pause' as part of a programmed sequence, step to the shot where you want the movement to wait and press 'Insert Shot'. This will repeat the shot. Then step back to the first of the two identical shots and set the Move Type to 'Linear' and the time to be however long you want it to wait there.

To change one parameter for the whole of a Sequence (the Border colour, for example, or if you want to run the whole Sequence with a frozen picture), step back to the first shot, make the modification and press 'Replace'. The system stores all the parameters for the first shot, then only *changes* in subsequent shots, so each shot will not need to be changed.

RUNNING SEQUENCES

User-Programmed Sequences 0 to 9 can be run by pressing 'SEQ', then a Number Pad button and the 'ENTER' button.

The Pre-Programmed Sequences supplied with the system can be run by pressing 'SEQ', then a two-digit number (between 10 & 35) on the Number Pad and the 'ENTER' button.

Note that *most* of these pre-programmed Sequences will run satisfactorily on single-channel systems (MS830 and MS831), but some are designed specifically for two-channel use (MS832). For running both channels, ensure 'BOTH' is on. These sequences are numbered such that ones with Even numbers run from Channel 1 to Channel 2 (or Background in Single-Channel systems), while those with Odd numbers run from Channel 2 to Channel 1.

'GO' repeats the last Sequence that was run, always in the same direction, as indicated by the LEDs in the 'IN/OUT' button (IN = Forwards (as it was programmed, OUT = backwards). The movement can be paused with 'STOP'. Pressing 'GO' will make it continue. Once the movement has been completed, 'STOP' resets it to the start point of the Sequence.

Sequences can be triggered to start from an external Edit Controller with a General Purpose Interface connection, which performs the same function as pressing 'GO' (when the 'G.P.I.' button is ON) - see the G.P.I. reference. 'Move to Start' can also be performed remotely in the same way.

SPEED OF SEQUENCES

When a Number Pad button (or buttons) and 'Enter' is pressed to run a Sequence, the time taken is the sum of the programmed times for all the individual shots. This time can be modified for subsequent running with the 'GO' button by pressing 'FNCTN' (beside the Spinwheel) to show the Sequence Time on the display. The time (in frames) can be modified (up to a maximum of 999 frames - 40 sec PAL, 33 sec NTSC). If a new Sequence is run, the Sequence Time will be reset to the programmed time for that Sequence.

SEQUENCE PROGRAMMING & RUNNING (Continued)

The Pre-Programmed Sequences are listed below. All of them will run on a two-channel system (MS832).

Number 22 will not provide any effect on a MS831 Single Channel system, because it only has Channel 2 moving. Some other Sequences will have a reduced impact on an MS831, because they were written with the two channels moving together; however something useful should always result.

Number 22, 25, 28 & 29 will not provide any effect on a MS830 System, because they rely on the Mixer function. Again, there will be a reduced impact on some because of the lack of the Built-In Mixer functions.

- | | | |
|----|------------------|---|
| 10 | Perspect - AB | Tilt Channel 1's top away & slide it off the bottom |
| 11 | Vert Persp - AB | Rotate Chan.2 down & Chan.1 in from top (full size) |
| 12 | Vert. Box - AB | Squeeze Chan.1 onto box, rotate to Chan. 2 & zoom up |
| 13 | Bounce - BA | Drop Chan.1 in from the top, so that it 'bounces'. |
| 14 | Angle Slide - AB | Skew Ch.1 to the right, slide in Ch.2 (also skewed) |
| 15 | Horiz Box - BA | Squeeze Chan.2 onto box, rotate to Chan. 1 & zoom up |
| 16 | Page Turn - AB | Turn up & off the bottom right corner of Chan.1. |
| 17 | Drop In - BA | Ch.1 'falls' in from top, going larger than full size |
| 18 | Horiz Push - AB | Channel 1 - Channel 2 Push On/Push Off (to the right) |
| 19 | Horiz Push - BA | Channel 2 - Channel 1 Push On/Push Off (to the right) |
| 20 | Skew Zoom - AB | Ch.1 has Skew & Perspective, goes to top R.H. corner |
| 21 | Corner Zoom - BA | CH.1 Zooms in from the top Left-Hand corner |
| 22 | Zoom Up - AB | Chan.2 Mixes in and Zooms from top to full size |
| 23 | Zoom Up - BA | Chan.1 Mixes in and Zooms from top to full size |
| 24 | Blinds - AB | Blinds sections of Chans. 1 & 2 slide horizontally |
| 25 | Pix. Fade - BA | Ch.2 pixellates and mixes to Ch.1, which goes normal |
| 26 | Multitumble - AB | Chans 1 & 2 tumble around each other, ending on Ch.2 |
| 27 | Multitumble - BA | Chans 1 & 2 tumble around each other, ending on Ch.1 |
| 28 | MIX (Fade) - AB | Full Size Chan.1 mix (dissolve) to full size Chan.2 |
| 29 | MIX (Fade) - BA | Full Size Chan.2 mix (dissolve) to full size Chan.1 |
| 30 | Horiz Wipe - AB | Top to bottom Horizontal Wipe Pattern Ch.1 to Ch.2 |
| 31 | Horiz Wipe - BA | Top to bottom Horizontal Wipe Pattern Ch.2 to Ch.1 |
| 32 | Vert. Wipe - AB | Left to right Vertical Wipe Pattern Chan.1 to Chan.2 |
| 33 | Vert. Wipe - BA | Left to right Vertical Wipe Pattern Chan.2 to Chan.1 |
| 34 | Wobble Wipe - AB | Left to right Curved edge Wipe Pattern Ch.1 to Ch.2 |
| 35 | Circle Wipe - BA | Channel 1 being wiped on with a centre Circle Wipe |

SIMPLE PAL

The input can be set to 'Simple PAL', which does not have the 2-line chroma 'averaging'.

Using Simple PAL can cause chroma errors towards the end of each line, but should be used when playing a VTR in Dynamic Tracking mode (faster or slower than normal speed), where the length of each line is different to the standard 64µs.

To set the Simple PAL function:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F3) I/P (F1) OTHER (F4) PAL-S (F1)

Simple PAL is turned on and off with button 1.

It should be reset to the normal 'On' state when not using Dynamic Tracking.

SIZE ADJUSTMENT

The picture size can be adjusted, either Horizontal and Vertical Size together or independently, up to twice normal size.

Manually Zooming the picture up and down (Expanding and Compressing) is easily achieved with the three-axis Joystick. Individual control of the Horizontal and Vertical sizes can be carried out with the T-Bars, or (for greater accuracy and repeatability), with the Spinwheel. When the picture is very small (in either or both dimensions) the 'Small Size' LED in the middle of the panel will be lit to indicate what has happened to the image.

There are three ways of controlling the Size of the Picture:

To set the Joystick to control the picture size:

Press: **FNCTN** (beside Joystick)

The 'Size/Posn' LED below the Joystick is now lit, and twisting the Joystick also adjusts the size of the picture. Note that the position is also now controllable.

To adjust the Horizontal and Vertical sizes individually:

Press **BEND** 3 times; (the display shows **H SIZE** and **V SIZE**).

Use T-Bar 1 to control the Horizontal Size and T-Bar 2 to control Vertical Size. The T-Bars can be turned off temporarily (to hold the current Sizes) with the 'CE/C' button (in the Number Pad).

SIZE ADJUSTMENT (Continued)

For more accurate positioning (for example to make the picture exactly fit over a particular part of the background image):

Select 'Top Level' Menu - **CHOOSE FUNCT 1** (with Solid Up Arrow)

EFX (F3) **SIZE (F3)** **H SIZ (F1)** or **V SIZ (F2)**

The Spinwheel can now be used for fine control of the horizontal or vertical Size of the picture. The value is shown in the top line of the LCD display; this can be noted for return to exactly the same position at a later time.

'**CAL**' (beside the Spinwheel) returns the picture to the full size of whichever direction was being adjusted.

'**NORM**' (**F4**) normalises the picture size and turns off the Size function.

'**ZOOM**' (**F3**) enables the Horizontal and Vertical sizes to be adjusted together, such that the picture has a normal aspect ratio.

See also: '**Bend**' (for adjustment of the size with the T-Bars).

SKEW FUNCTION

This maintains the horizontal size of the whole picture, and changes the angle of all the vertical lines in it, up to about 45°.

There are two ways of controlling the Skew function:

Press **BEND** twice; (the display shows **SKEW** and **CREASE**)

Use T-Bar 1 to control the **SKEW** function. The T-Bar can be turned off temporarily (to hold the current Skew value) with the 'CE/C' button (in the Number Pad).

For more accurate manipulation (for example to make the picture exactly fit over a particular part of the background image):

Select 'Top Level' Menu - **CHOOSE FUNCT 1** (with Solid Up Arrow)

EFX (F3) **WARP (F1)** **SKEW (F2)**

The Spinwheel can now be used for fine control of the Skew function, the value is shown in the top line of the LCD display. 'CAL' (beside the Spinwheel) returns it to the normal (vertical) setting.

See also: 'Perspective', 'Crease' and 'Circle'.

SLIDE

A Slide is one of the pre-set 'MOVES' of the unit. It can be run directly with the buttons on the Number Pad; the direction as indicated by the arrows on the buttons. The Horizontal and Vertical Slides (Number Pad buttons 2, 4, 6 & 8) move the picture between its current position and locations one picture's width beyond the edges. Similarly, the Corner Slides (buttons 1, 3, 7 & 9) move the picture between the current position and off-screen locations diagonally.

In each case the size and shape of the picture are not affected. Thus, it is possible to Slide a zero-size picture (after Zooming it down, for example); such a move would not be visible, but the Small Screen Indicator (centre of panel) would be lit.

The Slide can have one or more Tumbles and/or Flips when running (by pressing **EFX** once and selecting **TUMB (F2)**, then turning on either **TUMB (F2)** or **FLIP (F1)** to show how many rotations will be performed during the Move). The Slide can be repeated with the GO button, swapping direction each time (as shown by the 'IN/OUT' button).
For more details, see 'MOVE CONTROL'.

When a Slide has been run 'Out' (so that the picture disappears), the 'Off Screen' LED in the middle of the panel will be lit to indicate what has happened to the image.

To run a SLIDE:

Press **MOVE**, to show 'INSTANT EFFECTS' on the display.

Press **SLIDE (F1)**, then Button **1 2 3 4 6 7 8** or **9** (on Number Pad).

To adjust the speed:

Press **FNCTN** (beside Spinwheel), adjust Spinwheel for the required time (in frames) for the move, as shown on the top row of the LCD display.

See also: 'Move Control'.

SOFTWARE VERSION DISPLAY

The current version of internal P163 Controller internal software and the CPU software of the P164 can be shown on the LCD Display. This may sometimes be useful for fault diagnosis.

To display the Software Versions:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F3) VERS (F4)

The P163 Controller internal software version is shown on the top line of the display, while the P164 CPU software version is on the bottom line.

If there should be any problems with the system, first use the 'Reset System' function (see separate reference). If that does not completely clear the problem, it may be useful to inform CEL of the relevant version numbers.

Note that this Instruction Manual was written for the control of P163 Panel Software version 1.3 and P164-38 C.P.U. Software version 4-42 (current at the time of writing). If your unit has later software than these (indicated by higher numbers shown in the display) then a few of the control functions may not perform exactly as described.

SOURCE SELECTION

The eight possible video inputs to the/each P164 can be selected (note that not all of them can be connected at the same time - see Section 5.1 of the P164 Instruction Manual, 'Input Connections').

COMPOSITE VIDEO INPUTS

Each of the four Composite Inputs can be selected as follows:

Press **SOURCE** to show Composite Input Selection on the display.

Press: **IP1 (F1)** **IP2 (F2)** **IP3 (F3)** or **IP4 (F4)**

or press: **SOURCE** 1 2 3 or 4 (on Numerical Keypad)

The first letter of the relevant input on the display will flash, and the LED in button 1, 2, 3 or 4 will light to show the selection.

S-VHS Y-C INPUT

Signals from S-VHS machines with 4-pin or 7-pin connectors can be selected, with the rear panel switch set to 'YC'. Note that it is not possible to have both S-VHS Y-C and Dub connected.

To select S-VHS Y-C Input:

Press **SOURCE** to show Composite Input Selection on the display.

Press: **Outline Up Arrow** **Y / C (F2)** **S-VHS (F1)**

or press: **SOURCE** 5 (on Numerical Keypad)

The first letter of the word S-VHS on the display will flash, and the LED in button 5 will light to show the selection.

SOURCE SELECTION (Continued)

DUB (U-MATIC) INPUT

The Dub signal from a High-Band or Low-Band 3/4-inch U-Matic VTR can be selected. Remember to set the slider switch beside the connector on the rear panel to HB or LB as appropriate for High or Low Band. A Composite signal from the VTR is also connected to Input 2. It is not possible to have DUB and S-VHS Y-C connected at the same time.

To select S-VHS Y-C Input:

Press **SOURCE** to show Composite Input Selection on the display.

Press: **Outline Up Arrow** **Y / C (F2)** **DUB (F4)**

or press: **SOURCE** **6** (on Numerical Keypad)

The first letter of the word DUB on the display will flash, and the LED in button 6 will light to show the selection.

Y U V COMPONENT INPUT

The Y U V component signals are connected to Video 1, 3 & 4 (respectively); this mode by-passes any input filtering, so gives higher-quality pictures.

Component input is selected by:

Press **SOURCE** to show Composite Input Selection on the display.

Press: **Outline Up Arrow** **YUV (F3)** **ANALOGUE (F1)**

or press: **SOURCE** **7** (on Numerical Keypad)

The first letter of the word ANALOGUE on the display will flash, and the LED in button 7 will light to show the selection.

SOURCE SELECTION (Continued)

DIGITAL Y U V INPUT (OPTION)

For Digital Input, on units fitted with the Digital I/O option:

Press **SOURCE** to show Composite Input Selection on the display.

Press: **Outline Up Arrow** **YUV (F3)** **DIGITAL (F4)**

or press: **SOURCE** **8** (on Numerical Keypad)

The first letter of the word DIGITAL on the display will flash, and the LED in button 8 will light to show the selection.

SPEED OF MOVES AND SEQUENCES

The Speed of a Move or Sequence (User-programmed or pre-programmed) can be adjusted.

The minimum time that can be set is one frame (virtually instantaneous), the maximum for a Move is 300 frames (12 seconds for PAL, 10 seconds for NTSC) or for a Sequence 999 frames (40 seconds or 33 seconds).

There are separate Speed Settings for Moves and Sequences, and each can be adjusted individually. When a new Sequence is run, the 'Sequence Time' is reset to the value stored for the new Sequence.

To adjust the Speed:

Press **FNCTN** (beside Spinwheel), adjust the Spinwheel for the required time (in frames) for the Move or Sequence, as shown on the top row of the LCD display.

See also: 'Move Control' and 'Sequence Programming & Running'

STANDARD SELECTION OF INPUT

The Input Video Standard may be set to:

PAL Normal standard throughout most of Europe (and associated countries), etc.

Press **SOURCE** to show Composite Input Selection on the display.

Press **Outline Up Arrow** **STD (F4)** **PAL (F3)**

SECAM Applies to both French/Russian (Vertical) and the variety used in some Arabic countries (Horizontal). The P164 will accept signals with or without the Vertical Interval Colour Sequence Synchronisation signals ('Bottles').

Press **SOURCE** to show Composite Input Selection on the display.

Press **Outline Up Arrow** **STD (F4)** **OTHER (F1)** **SECAM (F1)**

NTSC 3.58MHz Normal standard for North America, etc.

Press **SOURCE** to show Composite Input Selection on the display.

Press **Outline Up Arrow** **STD (F4)** **NTSC (F4)**

NTSC 4.43MHz As used in some European NTSC applications.

Press **SOURCE** to show Composite Input Selection on the display.

Press **Outline Up Arrow** **STD (F4)** **OTHER (F1)** **NTSC 4.43 (F3)**

The selected type of input will have a flashing first letter in the display.

See also: 'Automatic Standard Selection'.

SUBCARRIER PHASE ADJUSTMENT

The Subcarrier (or Chroma) Phase can be controlled to give adjustment of the Chroma phase (about $\pm 10^\circ$). This only applies if there is a Reference signal connected to the rear panel input.

Full 360° range is available inside the unit on the Encoder card (ENC) near the bottom (see Section 5.2, 'REFERENCE INPUT' for details).

For Fine adjustment of the Subcarrier Phase:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

SETUP (F4) O/P (F2) S/C (F3)

The Subcarrier Phase can then be adjusted with the Spinwheel.

See also: 'Genlock', 'Horizontal Phase Adjustment' and 'Hue of Input'

TEST PATTERNS

There are four internal Test Patterns in the P164 which can be selected, for use as test signals. These are generated digitally, thus pass through the output encoder section of the P164, but not the input analogue to digital converter. It is not possible to do any effects on a Test Pattern.

The signals are as follows:

Test Pattern 1 - **Colour Bars** (similar to E.B.U. Bars)
100% White, 75% Colour Saturation

Test Pattern 2 - **Multiburst**
50% Grey, 0.5 1.5 2.5 3.58 4.43 5.5MHz

Test Pattern 3 - **Pulse and Bar**
20T Pulses (V & U), 2T Luma, White Bar, Ramp

Test Pattern 4 - **U and V Test Signal** (P164 Specific)
Zero to full range ramp of U and V signals.

To turn the Test Patterns On and Off:

Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)
Select Auxiliary menu - CHOOSE FUNCT 2 (with Right Arrow)

TPAT (F2) 1 (F1) 2 (F2) 3 (F3) or 4 (F4)

The chosen Test Pattern number on the display flashes to show the selection.

To turn a Test Pattern off, press the same button again; this returns the output to the previously selected picture.
Alternatively, press 'SOURCE' (below the Number Pad).

THERMAL SHUTDOWN

If a P164 unit should become too hot (due to insufficient ventilation, etc.) an automatic Thermal Shutdown will cut out the mains power to reduce the amount of damage that can be caused by such overheating.

When the Thermal Shutdown has activated, a Red Light on the rear of the P164 unit (beside the mains connector) will come on.

No action need be taken by the operator.

Once the temperature has dropped sufficiently, power will automatically be restored to the unit.

It is important to ensure that there is always plenty of ventilation around all of the rack-mounted units of the system.

TUMBLE

Any 'Move' (Slide, Fold or Zoom), or a movement between two shots of a programmed sequence, can have one, two or three Tumbles as the movement is performed. A Tumble is a complete rotation about a central horizontal axis, with the picture inverted in the middle of the movement.

If it is set to '1', every move run will have a Tumble until it is turned OFF again; similarly for '2' and '3'. When used in Sequences, the Tumble(s) apply to the move **from** the Shot (or keyframe) in which the function is turned on to the next Shot. If a half-Tumble is required, then one shot should be set with 'Vertical Invert' ON, so that the picture resets to normal by rotating half a turn about the horizontal axis (see 'Inversion').

Moves with Tumble turned on can also have a Perspective Effect, where the top of the picture appears to fall away from or towards the viewer (for Move Direction In & Out, respectively) - see 'Perspective in Movement'.

Moves can also have 'Flip' (rotation about a vertical axis) - see separate reference.

To set the Tumble function:

Press **EPX** button (bottom right); display will show 'EFFECTS 1'

TUMB (F2) **TUMB (F2)**

Turns the Tumble Function from Off to 1, 2 or 3 (as shown on the Display).

See also: 'Move Control', 'Perspective in Movement' and 'Flip'.

WARPS

This is a general term to describe the various picture manipulation functions that the MS83X series of Digital Effects systems can provide. Particularly, it refers to:

Perspective This maintains the middle horizontal size of the picture, and changes the ratio of the lengths of the top and bottom edges, giving a one-dimensional Perspective effect.

Skew Changes the angle of all the vertical lines in the picture, leaving the horizontal lengths and directions unaffected.

Crease Maintains the horizontal size of the top and bottom edges of the picture, and changes the middle horizontal size (to put a 'Crease' in the middle of the picture). The centre joins to the top and the bottom edges in a straight-line relationship.

Circle Similar to Crease, approximately maintaining the lengths of the top and bottom edges, but with a curved (or circular) function between the middle and the top and bottom sizes. This makes it possible to form the picture into a circle.

These Warp functions are available in two ways:

Press **BEND** either once or twice, and control the functions with the T-Bars as indicated on the LCD display. The T-Bars can be turned off temporarily (to hold the current value) with the 'CE/C' button (in the Number Pad).

or: Select 'Top Level' Menu - CHOOSE FUNCT 1 (with Solid Up Arrow)

EFX (F3) WARP (F1) PERSP (F1) SKEW (F2) CRSE (F3) CIRC (F4)

The Spinwheel can now be used for fine control of the selected function, the value is shown in the top line of the LCD display. 'CAL' (beside the Spinwheel) returns it to the normal setting.

For more details of the individual functions, see the references for each one. See also: 'Bend' for information on assigning the T-Bars.

WOBBLE

This function adds a wavy effect to the picture, distorting the vertical lines in it to become a number of curves. These curves can be stationary or moving up and down. The lengths of any individual horizontal lines will be unaffected, but they may be displaced to one side.

To set the Wobble function to be On:

Press **EFX** button (bottom right); display will show 'EFFECTS 1'

WOB (F3) ON/OFF (F4) Turns Wobble Function On and Off (as shown).

Once it has been turned on, the parameters of the Wobble function are shown in the display. They may be adjusted as follows:

SIZE - T-Bar 1: Causes the amplitude of the 'waves' to become bigger. For a Phase value of Zero, a positive amplitude causes the wave immediately below the middle of the picture to move to the right.

PHASE - T-Bar 2: Changes where the oscillations start for stationary Wobble values. Continuously moving waves are set with negative values. Smaller numbers (-1 to -255) give waves moving upwards, larger negative numbers (-256 to -512) produce waves moving downwards.

FREQUENCY - Spinwheel: Changes the number of waves of Wobble, from Zero (equivalent to Skew) up to a maximum of eight.

ZOOM

A Zoom is one of the pre-set 'MOVES' of the unit. It can be run directly with the buttons on the Number Pad; the direction as indicated by the arrows on the buttons (Number Pad buttons 1 to 9). Zoom is the Power-On default setting of the unit; as soon as it is turned on, Zooms can be run straight away by pressing any of the Number Pad buttons.

The Zoom causes the picture go between its current size, shape and position and zero-size at the nine positions (the four corners, centre of each edge and centre of screen).

The Zoom can have one or more Tumbles and/or Flips when running (by pressing the EFX button once and selecting **TUMB (F2)**, then turning on either **TUMB (F2)** or **FLIP (F1)** to show how many rotations will be performed during the Move). It can be repeated with the GO button, swapping direction each time (as shown by the 'IN/OUT' button).

When a Zoom has been run 'Out' (so that the picture disappears), the 'Small Size' LED in the middle of the panel will be lit to indicate what has happened to the image.

To run a ZOOM:

Press **MOVE**, to show 'INSTANT EFFECTS' on the display.

Press **ZOOM (F3)**, then Button **1 2 3 4 5 6 7 8 or 9** (on Number Pad).

To adjust the speed:

Press **FNCTN** (beside Spinwheel), adjust Spinwheel for the required time (in frames) for the move, as shown on the top row of the LCD display.

Manual control of the Zoom function is also possible, with the Joystick or the Spinwheel - see 'Size Adjustment'.

See also: 'Move Control'.

5.0 CONNECTIONS AND INSTALLATION

The P163 unit is connected to one or two P164 Digital Effects Framestores (via the round seven-pin plug) to provide all the control functions; it also derives its power from the Channel 1 P164. There are two General Purpose Interface (G.P.I.) connections, which use the round five-pin plug.

There are diagrams included to show suggested connections for the system, with and without a Built-In Mixer card (B.I.M.) in a P164. Of course, every user's installation will have a different arrangement and it is impossible to show all the possible configurations. A Single-Channel system with a B.I.M. (MS831) is substantially similar to Dual-Channel (MS832), without the second P164 and the Genlock signals to external equipment fed from the Black & Burst output of the first (and only) P164.

Note that the Channel 2 Key input is a TTL (computer) level, so is not normally suitable for connecting other effects or graphics equipment - it is recommended that Channel 3 is used instead, whether the system is single or dual channel.

Additional details of the connections to the P164 units are given in the P164 Instruction Manual (Section 5), so only brief explanations are given here. Note that not all the inputs can be connected at the same time, details are given in the P164 Instruction Manual.

5.1 CONTROL CONNECTIONS

The P163 is connected to one (or both) P164(s) with the 'Y' cable supplied (two yellow D-Types to a multipin). It is plugged into the round seven-pin plug on the short cable at the rear of the rear of the unit. The thick lead is for Channel 1 (or the only P164 in a single-channel system), and the thin lead is for channel 2 - this should be coiled up for use in single-channel systems. On the P164 the lead goes into the yellow 'Controller' socket.

The two G.P.I. connections are made via the other 'Y' cable (two BNCs to a round five-pin plug), which plugs into the other short cable (with a five pin plug on it). The Red BNC is 'GO' and the Black one 'Move to Start'. For more details of how these are used with an external Edit Controller, see the G.P.I. reference in Section 4.

5.2 P164 INPUT CONNECTIONS

COMPOSITE VIDEO INPUTS 1 to 4 (Sources 1, 2, 3, & 4)

Accepts non-synchronous video from VTRs, remote sources, etc. These Inputs all need to be terminated with 75 ohms.

S-VHS Y-C INPUT (Source 5)

The Y-C lead from the S-VHS VTR is connected to the 4-pin or 7-pin Y-C input (as appropriate); selector switch beside the connector set to 'YC'.

DUB U-MATIC INPUTS (Source 6)

Dub lead to 'DUB Y' socket, selector switch beside it set to 'HB' or 'LB' for High or Low Band. Also connect the

Composite video from VTR to I/P 2 for the Chroma information.

Y U V COMPONENT INPUTS (Source 7)

Luma (Y) - I/P 1, Chroma (U) - I/P 3, Chroma (V) - I/P 4
These Inputs all need to be terminated with 75 ohms.

DIGITAL VIDEO INPUT (Source 8)

If the P164 is fitted with the Digital Input/Output option, standard CCIR 656 - 601 signals are input via DIO connector.

AUXILIARY INPUT

A 15-way D-Type connector enables most of the connections from a VTR to be made with a single lead. These include: Luma (U-Matic), Luma (Y-C), Chroma (Y-C), Dynamic Tracking, Drop-Out and Advanced Sync. For details of connections, see the P164 Instruction Manual (Section 5.1).

KEY INPUT

An Input Key signal can be used to select only part of the input video picture for manipulating. It is processed with the video signal, so must be synchronous with it. The Key signal may be TTL or video level (in which case the Clip level can be adjusted). The Key Delay can be adjusted, to compensate for different timings in the Video and Key signal paths. For details, see 'KEY INPUT' reference in Section 4.

REFERENCE INPUT

A Genlock signal (Black & Burst or Composite) can be connected to 'REF IN'. Genlock is turned on from the P163 by pressing: Solid Up Arrow, SETUP (F4), GENLOCK on/off (F2), this makes the P164 synchronise with the Reference signal.

The Subcarrier Phase can be adjusted by about $\pm 10^\circ$ from the P163 (see the reference in Section 4). Full 360° control is available with a control inside the P164. To gain access, loosen the six screws holding the Front Panel, and swing it away to reveal an Air Mask. Do not remove the Air Mask. The Subcarrier Phase control is at the bottom, just right of centre. Pass a small screwdriver through the Air Mask hole and adjust the 10-turn pot until the Chroma phase is correct.

DROP - OUT R.F. INPUT

The R.F. signal off-tape (from suitable VTRs) can be used to indicate where a tape drop-out has occurred. The RF signal level going below the pre-set threshold level indicates a drop-out. A section from the previous line is repeated to cover the missing information. If there are a lot of drop-outs in one field, the previous field is repeated. See the 'Drop Out Compensator' reference in Section 4 for details of setting the threshold level and turning it on and off.

5.3 P164 OUTPUT CONNECTOINS

MAIN VIDEO OUTPUT

For P164 units which do not have a B.I.M. fitted (MS830 systems, or Channel 2 of MS832), the Main O/P is a composite video output of the processed signal, inserted over the set Background colour.

For units with a Built-In Mixer, it is the system output, being the combination of all the video signals in the system as mixed and controlled by the P163.

AUXILIARY VIDEO OUTPUT

This is an identical feed to the Main output of the first option above. For units with a B.I.M., it provides an individual feed of that unit's output.

Y U V COMPONENT OUTPUTS

Separate Y U V signals (of the same picture as the AUX Output) are provided. These are normally set to give 0.7V peak to peak U & V Chroma for 100% Colour Bars.

Y - C S - VHS OUTPUT

This four-pin connector gives separate feeds of the Luma and Chroma signals (of the same picture as the AUX Output) for use with S-VHS VTRs. The Chroma signal is a filtered feed of the AUX composite output (rather than a pure, separately generated signal), so the AUX video output should not be connected at the same time, or the Chroma level of both will be affected. If a pure Y-C signal is required, switch settings are available inside the P164 to provide Chroma on the AUX socket - ask your dealer or CEL for advice.

DIGITAL VIDEO OUTPUT

If the P164 is fitted with the Digital Input/Output option, standard CCIR 656 - 601 signals (of the same picture as the AUX Output) are available from the DIO Output connector.

BLACK & BURST OUTPUT

A Black & Burst signal, of exactly the same timing as the MAIN Output is available, for genlocking other equipment.

KEY OUTPUT

This is a positive-going TTL signal which is 'High' wherever the manipulated active video picture is. It enables the output to be keyed over another picture using any video mixer (or switcher); this is particularly relevant for MS830 systems. If a Built-In Mixer is in use, the Key signal from the second channel is fed into it, and the keying for both channels is done automatically.

ADVANCED SYNC OUTPUT

This signal can be fed to the Sync input of VTRs to standardise the timing through units in an editing system. It is normally set to '0', for the minimum time delay through the system (see reference in Section 4).

PREVIEW OUTPUT (FROM B.I.M.)

This enables users with a Built-In Mixer system to view the individual outputs and Key signals that are available. It should be connected to a separate video monitor, and is not suitable for recording programme material from. See the reference in Section 4 for details of operation.

5.4 SETTING UP A SYSTEM

Once the system has been wired together (see the diagrams of suggested connections) some setting-up may be required.

SUBCARRIER PHASE

Ideally, a source of Colour Bars (from a camera, for example) and a vectorscope are needed for correct alignment. However, if a vectorscope is not available, an approximate setting can be made 'by eye' comparing the appropriate colours. See 'Reference Input' in Section 5.2 for details of adjustment methods. In a two-channel system adjust channel 1 first, because this will affect the second channel's setting.

For units with a B.I.M., it may be useful to feed the Colour Bars through the Video 1 Input loop-through of the Channel 1 P164 then the 'REF' loop-through (of the same unit) and into Channel 3 I/P of the B.I.M. connector. Move the picture down a little with the P163 Joystick to compare the signal through the T.B.C. and directly through Channel 3; it may be necessary to set the Key of Channel 3 to 'FULL' (see the 'MIX' reference in Section 4 for details). Repeat the same process with the signal looping-through Channel 2 video input (but leaving the other connections intact).

KEY WINDOW ALIGNMENT

The Key Window sets the exact position of the edges of the displayed picture when it is 'Keyed' over another video source. If it is not correct, either part of the picture will be cut off or the Background will be visible down one side.

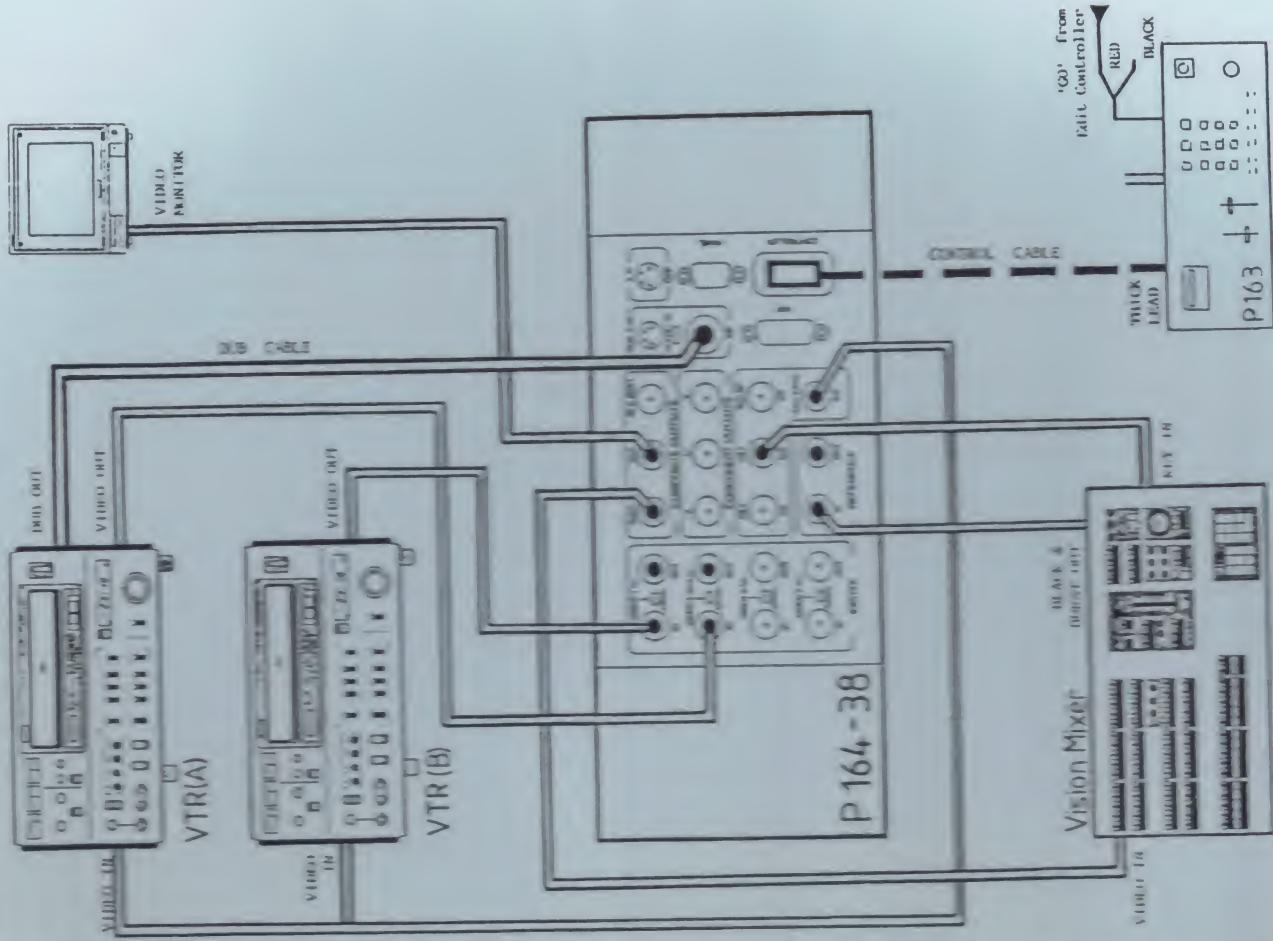
It is necessary to adjust each channel individually, with the picture slightly reduced in size (with the P163 Joystick) and Keyed over another signal. It is usually easiest if the 'background' picture is a plain colour and single a thin Border is set around the picture (of a contrasting luminance value). In addition, a Drop Shadow should be set, slightly offset to the right and NOT fully displaced vertically.

First, adjust the right-hand side with the Output Key Delay, as follows: Unscrew the P164 Front Panel and Internal Air Mask; carefully remove the Printed Circuit Board labelled 'BBO2' from the unit. Find the sliding switch labelled SW1 (near the connector). Adjust it and replace the board until the right-hand side of the Key Window is correct - this should be seen at the top, where a 'step' will appear beside the section of Border which does not have Drop Shadow beside it. The Normal setting is 7 or 8 for B.I.M. systems, 5 or 6 for use with an external mixer.

Systems without a B.I.M. (MS830) should now be fully timed, any further adjustments can be made at the external vision mixer. For B.I.M. systems (MS831, MS832), the left-hand Key edge can be trimmed. On the front of the BIM card in Channel 1 P164 are three 10-turn potentiometers, for Channel 1, 2 and 3 Key leading edge (from the left). With the same picture set-up as above, adjust the appropriate pot so that the Border width is the same on both sides of the picture and the Background does not quite show through.

Carefully re-assemble the P164. It is very important that the Air Mask is fitted correctly, or the unit will overheat.

SUGGESTED CONNECTION DIAGRAM FOR MS830 SYSTEM



[illegible]